f. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests, including documentation.
g. Procedures for tracking deficiencies from identification through acceptable corrective action. These procedures will establish verification that identified deficiencies have been corrected.
h. Reporting procedures, including proposed reporting formats; include a copy of the CQC report form.

C. Acceptance of Plans: Acceptance of the Contractor's basic and addendum CQC plans is required prior to the start of construction. Acceptance is conditional and will be predicated on satisfactory performance during the construction. Owner reserves the right to require Contractor to make changes in the CQC plan and operations including removal of personnel, as necessary, to obtain the quality specified.

D. Notification of Changes: After acceptance of the CQC plan, Contractor shall notify Engineer, in writing, a minimum of 7 calendar days prior to any proposed change. Proposed changes are subject to acceptance by Engineer.

3.06 CONTRACTOR QUALITY CONTROL REPORT

A. As a minimum, prepare a CQC report for every 7 calendar days. Account for all days throughout the life of the Contract. Reports shall be signed and dated by CQC System Manager. Include copies of test reports and copies of reports prepared by QC staff.

B. Maintain current records of quality control operations, activities, and tests performed, including the Work of subcontractors and suppliers.

C. Records shall be on an acceptable form and shall be a complete description of inspections, the results of inspections, daily activities, tests, and other items, including but not limited to the following:

1. Contractor/subcontractor and their areas of responsibility.
2. Operating plant/equipment with hours worked, idle, or down for repair.
3. Work performed today, giving location, description, and by whom. When a network schedule is used, identify each phase of Work performed each day by activity number.
4. Test and/or control activities performed with results and references to specifications/plan requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.
5. Material received with statement as to its acceptability and storage.

6. Identify submittals reviewed, with Contract reference, by whom, and action taken.
7. Offsite surveillance activities, including actions taken.
8. Job safety evaluations stating what was checked, results, and instructions or corrective actions.
9. List instructions given/received and conflicts in Drawings and/or Specifications.
10. Contractor's verification statement.
11. Indicate a description of trades working on the Project; the number of personnel working; weather conditions encountered; and any delays encountered.
12. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in file work and workmanship comply with the Contract.

3.07 SUBMITTAL QUALITY CONTROL

A. Submittals shall be as specified in Section 01 33 00, Submittal Procedures. The CQC organization shall be responsible for certifying that all submittals are in compliance with the Contract requirements. Owner will furnish copies of test report forms upon request by Contractor. Contractor may use other forms as approved.

3.08 TESTING QUALITY CONTROL

A. Testing Procedure:

1. Perform tests specified or required to verify that control measures are adequate to provide a product which conforms to Contract requirements. Procure services of a licensed testing laboratory. Perform the following activities and record the following data:
    a. Verify testing procedures comply with contract requirements.
    b. Verify facilities and testing equipment are available and comply with testing standards.
    c. Check test instrument calibration data against certified standards.
    d. Verify recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.
    e. Documentation:
        1) Record results of all tests taken, both passing and failing, on the CQC report for the date taken.
        2) Include specification paragraph reference, location where tests were taken, and the sequential control number identifying the test.

3) Actual test reports may be submitted later, if approved by Engineer, with a reference to the test number and date taken.
4) Provide directly to Engineer an information copy of tests performed by an offsite or commercial test facility. Test results shall be signed by an engineer registered in the state where the tests are performed.
5) Failure to submit timely test reports, as stated, may result in nonpayment for related Work performed and disapproval of the test facility for this Contract.

B. Testing Laboratories: Laboratory facilities, including personnel and equipment, utilized for testing soils, concrete, asphalt and steel shall meet criteria detailed in ASTM D3740 and ASTM E329, and be accredited by the American Association of Laboratory Accreditation (AALA), National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (AASHTO), or other approved national accreditation authority. Personnel performing concrete testing shall be certified by the American Concrete Institute (ACI).

3.09 COMPLETION INSPECTION

A. CQC System Manager shall conduct an inspection of the Work at the completion of all Work or any milestone established by a completion time stated in the Contract.

B. Punchlist:

1. CQC System Manager shall develop a punchlist of items which do not conform to the Contract requirements.
2. Include punchlist in the CQC report, indicating the estimated date by which the deficiencies will be corrected.
3. CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected and so notify the Owner.
4. These inspections and any deficiency corrections required will be accomplished within the time stated for completion of the entire Work or any particular increment thereof if the Project is divided into increments by separate completion dates.

END OF SECTION

SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. American Association of Nurserymen (AAN): American Standards for Nursery Stock.
2. Federal Emergency Management Agency (FEMA).
3. National Fire Prevention Association (NFPA): 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations.
4. Telecommunications Industry Association (TIA); Electronic Industries Alliance (EIA): 568B, Commercial Building Telecommunications Cabling Standard.
5. U.S. Department of Agriculture (USDA): Urban Hydrology for Small Watersheds.
6. OSHA 29 CFR 1910 and 1926.
7. U.S. Environmental Protection Agency (EPA):
   a. Oil Pollution Prevention, 40 CFR, Part 112.
   b. National Pollutant Discharge Elimination System (NPDES) (40 Code of Federal Regulations Part 122.26(a)(14)(x))
8. U.S. Weather Bureau: Rainfall-Frequency Atlas of the U.S. for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years.
9. Illinois Environmental Protection Agency:
   a. Illinois Administrative Code (IAC) Title 35, Sections 302.208 and 302.210.
   b. Illinois General NPDES Permit No. ILR10 for Storm Water Discharges from Construction Site Activities (IEPA 2013), IAC Title 35, Subtitle C, Chapter 1, Part 302, the and the guidance provided in the Illinois Urban Manual (www.aiswcd.org/IU).
   c. Air Pollution Control Rules, IAC Title 35, Subtitle B, Chapter 1, Part 212 Visible and Particulate Matter Emissions, Subpart K.
   d. IAC Title 35, Part 212.301, 212.315, and 212.316 of Subpart K Fugitive Particulate Matter.
   e. IAC Title 35, Subtitle H Part 900.102-106 Noise.

1.02 SUBMITTALS

A. Informational Submittals:

1. Copies of permits and approvals for construction as required by Laws and Regulations and governing agencies.
2. Temporary Utility Submittals:
   a. Electric power supply and distribution plans.
   b. Water supply and distribution plans.
   c. Dewatering well locations.
   d. Dewatering Plan including water treatment system details.
   e. Sanitary.
3. Temporary Construction Submittals:
   a. Access Roads: Routes, cross-sections, and drainage facilities.
   b. Parking area plans.
   c. Contractor's field office, storage yard, and storage building plans, including gravel surfaced area.
   d. Fencing and protective barrier locations and details.
   e. Engineer's field office plans.
   f. Staging area location plan.
4. Temporary Control Submittals:
   a. Noise control plan.
   b. Dust control plan.
   c. Stormwater Pollution Prevention Plan.
   d. Plan for disposal of waste materials and intended haul routes.

B. Action Submittals: Restoration Plan if required by Section 02 24 00, Delineation of Wetland and Other Waters of the United States.

1.03 MOBILIZATION

A. Mobilization includes, but is not limited to, these principal items:

1. Obtaining required permits.
2. Moving Contractor's field office and equipment required for first month operations onto Site.
3. Installing temporary construction power, wiring, and lighting facilities.
4. Providing onsite Internet service.
5. Providing onsite sanitary facilities and potable water facilities as specified and as required by Laws and Regulations, and governing agencies.
6. Arranging for and erection of Contractor's work and storage yard.

7. Posting OSHA required notices and establishing safety programs and procedures.
8. Having Contractor's superintendent at Site full time.
9. Providing Engineer's facilities.

B. Use area designated for Contractor's temporary facilities as shown on Drawings.

1. Area designated for temporary facilities shown on Drawings shall be tested to confirm that it is clean of any contamination before mobilization.
2. If contamination exists, Contractor shall excavate and clean the area before building out temporary facilities.

C. Progress payment for mobilization will not be approved.

1.04 PROTECTION OF WORK AND PROPERTY

A. Comply with Owner's safety rules while on Owner's property.

B. Keep Owner informed of serious onsite accidents and related claims.

C. Use of Explosives: No blasting or use of explosives will be allowed onsite.

1.05 VEHICULAR TRAFFIC

A. Traffic Control Plan: Adhere to traffic control plan reviewed and accepted by Engineer. Changes to this plan shall be made only by written approval of Engineer. Secure approvals for necessary changes so as not to delay progress of the Work.

B. Traffic Routing Plan: Show sequences of construction affecting use of roadways, time required for each phase of the Work, provisions for decking over excavations and phasing of operations to provide necessary access, and plans for signing, barricading, and striping to provide passages for pedestrians and vehicles.

1.06 TEMPORARY CONTROLS

A. Contractor will provide safety and environmental controls during remediation-related construction activities to protect the public, workers, and environment and ensure that all work is performed in a manner that meets the intent of federal, state, and local environmental regulations.

B. Stormwater Pollution Prevention Plan: Contractor will submit a Stormwater Pollution Prevention Plan for approval by the Owner's Representative. The Stormwater Pollution Prevention Plan will be consistent with substantive requirements of Illinois's General NPDES Permit No. ILR10 for Storm Water Discharges from Construction Site Activities (IEPA 2013), Illinois Administrative Code Title 35, Subtitle C, Chapter 1, Part 302, the National Pollutant Discharge Elimination System (NPDES) requirements (40 Code of Federal Regulations Part 122.26(a)(14)(x).) and the guidance provided in the Illinois Urban Manual (www.aiswcd.org/IU). The plan will:

1. Describe the best management practices for earth disturbing activities and procedures to control soil erosion, sediment transport, and potential spills, including from stockpiles of general backfill, topsoil, and excavated soils, excavations, and at the construction site entrance and exit.
2. Describe erosion and sediment control at staging, stockpiling, and storage areas, including silt fence or other appropriate measures and inlet protection.
3. Describe how water entering excavations and contained on top of liners will be discharged as clean stormwater and other stormwater management activities.
4. Address preplanning for spill control and spill control measures, including potential spills of decontamination rinsate, contaminated soils, vehicle fuel, and hydraulic oil.
5. Address fire control materials and equipment.
6. Address protection against stockpile runoff.
7. Describe inspection and maintenance procedures.

C. Contractor will install, inspect, maintain and provide recordkeeping for temporary stormwater pollution prevention and soil erosion and sediment control measures under the authorization of an Illinois qualified person (i.e., Professional Engineer, Certified Professional in Erosion and Sediment Control, Certified Erosion Sediment and Storm Water Inspector, or other knowledgeable person) who possesses the skills to assess conditions at construction site that could impact stormwater quality and assess effectiveness of any sediment and erosion control measures implemented. The Contractor will ensure that temporary stormwater pollution prevention and soil erosion and sediment control measures prevent erosion during earthwork activities at residential properties. The work will include the furnishing of all labor, materials, tools, and equipment to perform the work and services necessary as herein specified.

1. Erosion control will be performed in accordance with the Stormwater Pollution Prevention Plan and the Temporary Erosion and Sediment Control Plan.

2. Soil erosion stabilization and sedimentation control may consist of construction, inspection, maintenance and recordkeeping of temporary erosion control such as inlet protection, silt fences, erosion bales, etc. Inlet protection will be installed at the nearest downgradient storm sewer inlet.

D. Contractor will install, inspect, maintain, and remove temporary stormwater pollution prevention and erosion and sediment control measures to prevent erosion at the FA.

1. Soil erosion stabilization and sedimentation control will consist of the following elements:
   a. Construction, inspection, maintenance, and record keeping of temporary erosion and sediment control such as silt fences, erosion bales, etc. where runoff will occur onto unpaved surfaces.
   b. Excavated soils will be staged and managed with appropriate protection. The staging pile will be located on the FA, as shown on the Drawings, no greater than 10 feet high, sloped no greater than 4H:1V, and will be covered daily with plastic sheeting, or approved equivalent.
   c. Stockpiles will not be placed over existing monitoring wells located at the FA, nor will they prohibit access to existing monitoring wells.
   d. Temporary stockpile covering: Placement and maintenance of reinforced plastic covering over stockpiles during non-working hours or inclement weather to reduce fugitive dust emissions from staging piles and protect from precipitation and erosion.
   e. As necessary, place stone at the FA staging area between the stockpiles and the entrance to minimize tracking of soils from the staging area.
   f. Documentation of final restoration of staging pile at the FA.

E. The Contractor will restore wetlands and other waters of the United States, if required based on input from EPA, USACE, and other regulatory agencies based on the results of the wetlands and other waters delineation that Contractor performs per Section 02 24 00, Delineation of Wetlands and Other Waters of the United States.

PART 2 PRODUCTS

2.01 ENGINEER'S FIELD OFFICES

A. Furnish equipment specified for exclusive use of Engineer and its' representatives.

B. Ownership of equipment furnished under this article will remain, unless otherwise specified, that of Contractor.

C. Equipment furnished shall be new or like new in appearance and function.

D. Minimum Features:

1. 110-volt lighting and wall plugs.
2. Fluorescent ceiling lights.
3. Electric heating and self-contained air conditioning unit, properly sized for Project locale and conditions. Provide ample electric power to operate installed systems.
4. Provide railed stairways, and landings, and exterior lighting at entrances.
5. Exterior Door(s):
   a. Number: One.
   b. Type: Solid core.
   c. Lock(s): Cylindrical.
6. Number of Windows: Four.
7. Minimum Interior Height: 8 feet.

E. Plan table; plan rack; double desk with desk surface located 29 inches from floor; two 2-drawer, steel file cabinets; and overhead shelf.

F. Trailer Type Mobile Structure: One.

G. Floor Space: Minimum 425 square feet.

H. All-metal frame; all-metal exterior, sides, and roof; and insulated double walls, floor, and roof.

I. Security guard screens on windows.

J. Blinds or drapes on windows.

K. Work Surface: One, 30 inches by 10 feet at desk height of 29 inches from floor.

L. Office Equipment—General:

1. Bottled Water Service: One, with cooler capable of producing hot water and cold water.
2. Paper Towel Dispenser with Towels: One.
3. Desk: One, steel, 30 inches by 60 inches with desk surface located 29 inches from floor.
4. Desk Chair: One, with the following characteristics:
   a. Five castor base.
   b. Adjustable height.

c. Swivels.
d. Locking Back.
e. Adjustable seat back for height and angle.
f. Adjustable arms.

5. Folding Table: One, 36 inches by 72 inches.
6. Steel Folding Chairs: Two**.**
7. Drawing Rack with Drawing Hangers: One.
8. Wastepaper Basket: Two.
9. Blue Recycling Basket: Two.
10. Clothes Rack: One.
11. First-Aid Kit: One.
12. Tri-Class (ABC), Dry Chemical Fire Extinguisher, 10-Pound: One.

2.02 PROJECT SIGN

A. Provide and maintain one, 8-foot-wide by 4-foot-high sign constructed of 3/4-inch exterior high density overlaid plywood. Sign shall bear name of Project, Owner, Contractor, Engineer, and other participating agencies. Lettering shall be blue applied on white background by an experienced sign painter. Include Owner's and agency's logos full color. Provide exterior type enamel paint. Information to be included and logo graphic will be provided by Owner.

PART 3 EXECUTION

3.01 ENGINEER'S FIELD OFFICE

A. Make available for Engineer's use prior to start of the Work at Site and to remain on Site for minimum of 30 days after final acceptance of the Work.

B. Locate where directed by Engineer; level, block, tie down, skirt, provide stairways, and relocate when necessary and approved. Construct on proper foundations, and provide proper surface drainage and connections for utility services.

C. Provide minimum 100 square feet of gravel or crushed rock base, minimum depth of 4 inches, at each entrance.

D. Raise grade under field office, as necessary, to elevation adequate to avoid flooding.

E. Provide sanitary facilities in compliance with state and local health authorities.

F. Exterior Door Keys: Furnish two sets of keys.

G. Local Area Network (LAN):

1. Provide Ethernet network prewired in compliance with EIA/TIA 568B.
2. Ethernet wireless hub shall be capable of a minimum of four connections.
3. LAN shall be designed and installed by personnel experienced in similar LAN systems.

H. Telecommunications:

1. Provide cable Internet connection with minimum of five live portable computer (PC) ports.
2. Provide appropriate jacks, wiring, and equipment required for a complete telecommunications system.
3. Arrange and provide for telecommunication service for use during construction. Pay costs of installation, maintenance, and monthly service of internet connection.

I. Maintain in good repair and appearance, and provide weekly cleaning service and replenishment, as required, of paper towels, paper cups, hand soap, toilet paper, first-aid kit supplies, and bottled water.

J. Replenish, as needed, copy paper and toner.

3.02 TEMPORARY UTILITIES

A. Power:

1. No electric power is available at Site. Make arrangements to obtain and pay for electrical power used until final payment and acceptance by Owner, unless otherwise recommended by Engineer at Substantial Completion.
2. Cost of electric power will be borne by Contractor.

B. Lighting: Provide temporary lighting to meet applicable safety requirements to allow erection, application, or installation of materials and equipment, and observation or inspection of the Work.

C. Heating, Cooling, and Ventilating:

1. Provide as required to maintain adequate environmental conditions to facilitate progress of the Work, to meet specified minimum conditions for installation of materials, and to protect materials, equipment, and finishes from damage because of temperature or humidity.

2. Provide adequate forced air ventilation of enclosed areas to cure installed materials, to dispense humidity, and to prevent hazardous accumulations of dust, fumes, vapors, or gases.
3. Pay costs of installation, maintenance, operation, removal, and fuel consumed.
4. Provide portable unit heaters, complete with controls, oil- or gas-fired, and suitably vented to outside as required for protection of health and property.
5. If permanent natural gas piping is used for temporary heating units, do not modify or reroute gas piping without approval of utility company. Provide separate gas metering as required by utility.

D. Water:

1. No construction or potable water is available at Site. Make arrangements for and bear costs of providing water required for construction purposes and for drinking by construction personnel during construction.
2. Hydrant Water:
   a. Is available from nearby hydrants. Secure written permission for connection and use from water department and meet requirements for use. Notify fire department before obtaining water from fire hydrants.
   b. Use only special hydrant-operating wrenches to open hydrants. Make certain hydrant valve is open full, since cracking valve causes damage to hydrant. Repair damaged hydrants and notify appropriate agency as quickly as possible. Hydrants shall be completely accessible to fire department at all times.
   c. Include costs to connect and transport water to construction areas in Contract Price.

E. Sanitary and Personnel Facilities: Provide and maintain facilities for Contractor's employees, Subcontractors, and other onsite employers' employees. Service, clean, and maintain facilities and enclosures.

F. Fire Protection: Furnish and maintain on Site adequate firefighting equipment capable of extinguishing incipient fires. Comply with applicable parts of NFPA 241.

3.03 PROTECTION OF WORK AND PROPERTY

A. General:

1. Perform Work within right-of-way and easements in a systematic manner that minimizes inconvenience to property owners and the public.
2. No residence or business shall be cut off from vehicular traffic for a period exceeding 4 hours, unless special arrangements have been made.
3. Maintain in continuous service existing oil and gas pipelines, underground power, telephone or communication cable, water mains, irrigation lines, sewers, poles and overhead power, and other utilities encountered a long line of the Work, unless other arrangements satisfactory to owners of said utilities have been made.
4. Where completion of the Work requires temporary or permanent removal or relocation of existing utility, coordinate activities with owner of said utility and perform work to their satisfaction.
5. Protect, shore, brace, support, and maintain underground pipes, conduits, drains, and other underground utility construction uncovered or otherwise affected by construction operations.
6. Keep fire hydrants and water control valves free from obstruction and available for use at all times.
7. In areas where Contractor's operations are adjacent to or near a utility, such as gas, telephone, television, electric power, water, sewer, or irrigation system, and such operations may cause damage or inconvenience, suspend operations until arrangements necessary for protection have been made by Contractor.
8. Notify property owners and utility offices that may be affected by construction operation at least 2 days in advance: Before exposing a utility, obtain utility owner's permission. Should service of utility be interrupted due to Contractor's operation, notify proper authority immediately. Cooperate with said authority in restoring service as promptly as possible and bear costs incurred.
9. Do not impair operation of existing sewer system. Prevent construction material, pavement, concrete, earth, volatile and corrosive wastes, and other debris from entering sewers, pump stations, or other sewer structures.
10. Maintain original Site drainage wherever possible.

B. Signs and Equipment:

1. Conform to requirements of manual published by the Illinois Department of Transportation.

2. Portable TOW-AWAY-NO STOPPING Signs: Place where approved by police department and Owner.
3. Traffic Cones: Provide to delineate traffic lanes to guide and separate traffic movements.
4. High-Level Warning Flag Units: Provide two in advance of traffic approaching the Work, each displaying three flags mounted at a height of 9 feet.
5. Provide at obstructions, such as material piles and equipment.
6. Use to alert general public of construction hazards, which would include surface irregularities, unramped walkways, grade changes, and trenches or excavations in roadways and in other public access areas.

C. Waterways: Keep ditches, culverts, and natural drainages continuously free of construction materials and debris.

D. Dewatering: Construct, maintain, and operate cofferdams, channels, flume drains, sumps, pumps, or other temporary diversion and protection works. Furnish materials required, install, maintain, and operate necessary pumping and other equipment for the environmentally safe removal and disposal of water from the various parts of the Work. Maintain foundations and parts of the Work free from water. Allow pumped water to percolate into the ground where possible. Pumped water that discharges to a ditch, creek, or surface water must meet the water quality standards in 35 IAC Section 302.208 and 302.210. Submit a Dewatering Plan per Section 01 57 13, Pollution Prevention and Temporary Erosion and Sediment Control. including plans for a treatment system and associated monitoring, if necessary to meet these standards.

E. Archaeological Finds:

1. General: Should finds of an archaeological or paleontological nature be made within Site limits, immediately notify Owner and Engineer and proceed in accordance with General Conditions. Continue the Work in other areas without interruption.
2. Archaeological Finds: Evidence of human occupation or use of an area within contract limits prior to the Year 1840. Evidence may consist of skeletons, stone, or other utensils, or evidence of habitations or structures.
3. Paleontological Finds: Evidence of prehistoric plant or animal life, such as skeletons, bones, fossils, or casts and other indications such as pictographs.
4. Owner may order the Work stopped in other areas if, in Owner’s opinion, find is more extensive than may appear from uncovered material.

5. Protection of Finds:
    a. Implement protocols in the Unanticipated Discovery Plan (UDP) described in Section 31 23 16, Excavation. Cover, fence, or otherwise protect finds until notice to resume the Work is given.
    b. Cover finds with plastic film held in place by earth, rocks, or other weights placed outside the find. Should additional backfilling be necessary for safety or to prevent caving, place backfill material loosely over plastic film.
    c. Sheet or shore as necessary to protect excavations underway. Place temporary fence to prevent unauthorized access.
    d. Dewater finds made below water table as necessary to protect construction Work underway. Divert groundwater or surface runoff away from find by ditching or other acceptable means.
6. Removal of Finds:
    a. Finds are property of Owner. Do not remove or disturb finds without Owner's written authorization.
    b. Should Owner elect to have a find removed, provide equipment, labor, and material to permit safe removal of find without damage. Provide transportation for delivery to individuals, institutions, or other places as Owner may find desirable, expedient, or required by law.

F. Endangered and Threatened Species:

1. Take precautions necessary and prudent to protect native endangered and threatened flora and fauna.
2. Implement protocols in Section 31 10 00, Site Clearing.
3. Notify Engineer of construction activities that might threaten endangered and threatened species or their habitats.
4. Contractor will mark areas known as habitats of endangered and threatened species prior to commencement of onsite activities.
5. Additional areas will be marked by Contractor as other habitats of endangered and threatened species become known during construction.

3.04 TEMPORARY CONTROLS

A. Air Pollution Control:

1. Minimize air pollution from construction operations.
2. Burning of waste materials, rubbish, or other debris will not be permitted on or adjacent to Site.
3. Conduct operations of excavation and hauling in trucks to cause a minimum of dust. Give unpaved haul roads used in construction area a dust-preventive treatment or periodically water to prevent dust. Strictly adhere to applicable environmental regulations for dust prevention.

B. Noise Control:

1. Provide acoustical barriers so noise emanating from tools or equipment will not exceed legal noise levels.
2. Noise Control Plan: Propose plan to mitigate construction noise and to comply with noise control ordinances, including method of construction, equipment to be used, and acoustical treatments.

C. Water Pollution Control:

1. Divert sanitary sewage and nonstorm waste flow interfering with construction and requiring diversion to sanitary sewers. Do not cause or permit action to occur which would cause an overflow to existing waterway.
2. Prior to commencing excavation and construction, obtain Engineer's agreement with detailed Dewatering Plan showing procedures intended to handle and dispose of sewage, groundwater, and dewatering pump discharges. Pumped water discharges from excavations or dewatering wells that does not percolate back into the ground must comply with water quality standards in 35 Illinois Administrative Code Sections 302.208 and 302.210.
3. Comply with Section 01 57 13, Pollution Prevention and Temporary Erosion and Sedimentation Control, for stormwater flow and surface runoff.
4. Do not dispose of volatile wastes such as mineral spirits, oil, chemicals, or paint thinner in storm or sanitary drains. Disposal of wastes into streams or waterways is prohibited. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

D. Erosion, Sediment, Water Quality, and Flood Control: Provide, maintain, and operate temporary facilities as specified in Section 01 57 13, Pollution Prevention and Temporary Erosion and Sedimentation Control, to control erosion and sediment releases, protect surface water quality and to protect the Work and existing facilities from flooding during construction period.

3.05 STORAGE YARDS AND BUILDINGS

A. Temporary Storage Yards: Construct temporary storage yards for storage of products that are not subject to damage by weather conditions.

B. Temporary Storage Buildings:

1. Provide environmental control systems that meet recommendations of manufacturers of equipment and materials stored.
2. Arrange or partition to provide security of contents and ready access for inspection and inventory.

3. Store combustible materials (paints, solvents, fuels) in a well-ventilated and remote building meeting safety standards.

3.06 ACCESS ROADS

A. Construct access roads as shown and within easements, rights-of-way, or Project limits. Use existing roads where shown.

B. Maintain drainage ways. Install and maintain culverts to allow water to flow beneath access roads. Provide corrosion-resistant culvert pipe of adequate strength to resist construction loads.

C. Provide gravel, crushed rock, or other stabilization material to permit access by all motor vehicles at all times.

D. Maintain road grade and crown to eliminate potholes, rutting, and other irregularities that restrict access.

E. Coordinate with Engineer detours and other operations affecting traffic and access. Provide at least 72 hours' notice to Engineer of operations that will alter access to Site.

F. Upon completion of construction, restore ground surface disturbed by access road construction to original grade.

3.07 PARKING AREAS

A. Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations.

B. Provide parking facilities for personnel working on Project. No employee or equipment parking will be permitted on Owner's existing paved areas, except as specifically designated for Contractor's use.

3.08 VEHICULAR TRAFFIC

A. Comply with Laws and Regulations regarding closing or restricting use of public streets or highways. No public or private road shall be closed, except by written permission of proper authority. Ensure the least possible obstruction to traffic and normal commercial pursuits.

B. Conduct the Work to interfere as little as possible with public travel, whether vehicular or pedestrian.

C. Whenever it is necessary to cross, close, or obstruct roads, driveways, and walks, whether public or private, provide and maintain suitable and safe bridges, detours, or other temporary expedients for accommodation of public and private travel.

D. Road Closures: Maintain satisfactory means of exit for persons residing or having occasion to transact business along route of the Work. If it is necessary to close off roadway or alley providing sole vehicular access to property for periods greater than 2 hours, provide written notice to each owner so affected 3 days prior to such closure. In such cases, closings of up to 4 hours may be allowed. Closures of up to 10 hours may be allowed if a week's written notice is given and undue hardship does not result.

E. Maintenance of traffic is not required if Contractor obtains written permission from Owner and tenant of private property, or from authority having jurisdiction over public property involved, to obstruct traffic at designated point.

F. In making street crossings, do not block more than one-half the street at a time. Whenever possible, widen shoulder on opposite side to facilitate traffic flow. Provide temporary surfacing on shoulders as necessary.

G. Maintain top of backfilled trenches before they are paved, to allow normal vehicular traffic to pass over. Provide temporary access driveways where required. Cleanup operations shall follow immediately behind backfilling.

H. When flaggers and guards are required by regulation or when deemed necessary for safety, furnish them with approved orange wearing apparel and other regulation traffic control devices.

I. Provide snow removal to facilitate normal vehicular traffic on public or private roads affected by construction. Perform snow removal promptly and efficiently by means of suitable equipment whenever necessary for safety, and as may be directed by proper authority.

J. Notify fire department and police department before closing street or portion thereof. Notify said departments when streets are again passable for emergency vehicles. Do not block off emergency vehicle access to consecutive arterial crossings or dead-end streets, in excess of 300 linear feet, without written permission from fire department. Conduct operations with the least interference to fire equipment access, and at no time prevent such access. Furnish Contractor's night emergency telephone numbers to police department.

K. Coordinate traffic routing with that of others working in same or adjacent areas.

3.09 CLEANING DURING CONSTRUCTION

A. In accordance with General Conditions, as may be specified in other Specification sections, and as required herein.

B. Wet down exterior surfaces prior to sweeping to prevent blowing of dust and debris. At least weekly, sweep floors (basins, tunnels, platforms, walkways, roof surfaces), and pick up and dispose of debris.

C. Provide approved containers for collection and disposal of waste materials, debris, and rubbish. At least weekly, dispose of such waste materials, debris, and rubbish offsite.

D. At least weekly, brush sweep entry drive, roadways, and other streets and walkways affected by the Work and where adjacent to the Work.

END OF SECTION

SECTION 01 57 13
POLLUTION PREVENTION AND TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SUMMARY

A. This section covers Work to implement structural and nonstructural Best Management Practices (BMP) to control soil erosion by wind or water and keep eroded sediments and other construction-generated pollutants from moving off project sites. Requirements described in this specification and shown on the Drawings are part of the project Stormwater Pollution Prevention Plan (SWPPP) and are the minimum for all project construction sites and conditions. This specification covers all project activities, including material sources, disposal sites, and offsite mitigation areas unless specific project activities are excluded elsewhere in this specification or in other Contract Documents controlling the Work.

B. National Pollutant Discharge Elimination System: Comply with Federal, state, and local laws, rules and regulations, and the Illinois National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Discharge ILR10 General Permit substantive requirements, which are applicable to the project. A copy of the ILR10 General Permit, is available from Owner. NPDES General Construction permits are required on projects that involve disturbance of 1 acre or more with potential to discharge stormwater to surface waters.

C. Other Regulations: Local government erosion and sediment control permit best management practices and standards may apply. Adequate erosion and sediment control is essential for complying with the federal Endangered Species Act where construction runoff enters waters inhabited by protected species.

1.02 REFERENCES

A. Activities shall conform to the Illinois General NPDES Permit No. ILR10 for Storm Water Discharges from Construction Site Activities (IEPA 2013), IAC Title 35, Subtitle C, Chapter 1, Part 302, the guidance provided in the Illinois Urban Manual (www.aiswcd.org/IU) and the Illinois Erosion and Sediment Control Manual Standard Specifications, and Drawings. In the event of a conflict, the more stringent requirement shall apply.

B. The following is a list of standards that may be referenced in this section:

1. Illinois Environmental Protection Agency (IEPA) General NPDES Permit No. ILR10 for Stormwater Discharges from Construction Activities.
2. American Association of State Highway and Transportation Officials (AASHTO): M252, Standard Specification for Corrugated Polyethylene Drainage Pipe.
3. ASTM International (ASTM):
   a. D638, Standard Test Method for Tensile Properties of Plastics.
   b. D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
   c. D3776/D3776M, Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.
   d. D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
   e. D4397, Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
   f. D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
   g. D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
   h. D4632/D4632M, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
   i. D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile
   j. D6241, Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
   k. D6459, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion.
   l. D6460, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion.
   m. D6475, Standard Test Method for Measuring Mass Per Unit Area of Erosion Control Blankets.
   n. D7322, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions.
   o. D7367, Standard Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting.

4. National Weather Service:
   a. Precipitation-Frequency of the United States by State/Territory, 2012.
   b. Precipitation Frequency Data Server, 2012.
5. North American Weed Management Association (NAWMA).
6. U.S. Department of Agriculture, Natural Resources Conservation Service: *Urban Hydrology for Small Watersheds*; 1986. Technical Release 55.
7. U.S. Environmental Protection Agency:
   a. Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites, 2007. EPA-833-R-06-004.
   b. National Menu of BMPs, 2012.

1.03 SYSTEM DESCRIPTION

A. Erosion and Sediment Control:

1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases during construction period.
2. Design erosion and sediment controls to handle peak runoff resulting from 25-year, 24-hour storm event based on National Weather Service: Precipitation Frequency Data Server.
3. Size temporary stormwater conveyances based on procedures presented in U.S. Department of Agriculture, Natural Resources Conservation Service: Urban Hydrology for Small Watersheds, 1986. Technical Release 55.

B. Erosion and Sediment Control (ESC) Lead:

1. Identify the ESC Lead at the preconstruction discussions and in the TESC Plan. The ESC Lead shall have certification in construction site erosion and sediment control from a course approved by Owner.
2. The ESC Lead shall implement the TESC Plan, including, but not limited to:
   a. Installing and maintaining all temporary erosion and sediment control Best Management Practices (BMPs) included in the TESC Plan to assure continued performance of their intended function. Damaged or inadequate TESC BMPs shall be corrected immediately.
   b. Updating TESC Plan to reflect current field conditions.
   c. Terminating TESC Plan.

3. When a TESC Plan is included in the Contract Plans, ESC Lead shall also inspect all areas disturbed by construction activities, all onsite erosion and sediment control BMPs, all stormwater discharge points, and all temporarily stabilized inactive sites per schedule in the Construction Stormwater Discharge Permit(s) or as directed by Engineer. Complete erosion and sediment control inspection form provided by water resource agency or Owner for each inspection and submit a copy to Engineer no later than end of the next working day following inspection.

C. Personnel Training: Prior to commencement of construction, applicable personnel must have an understanding of the Construction Stormwater Discharge Permit's requirements and their specific responsibilities under the permit. At a minimum, personnel must be trained to understand the following as it relates to the scope of their job duties:

1. The location of all stormwater controls and how to maintain them.
2. Procedures for complying with the pollution prevention requirements.
3. Procedures for conducting inspections, recording findings, and taking corrective action.

D. Temporary Erosion and Sediment Control Plan (a component of the Stormwater Pollution Prevention Plan):

1. Contractor shall prepare and submit a Stormwater Pollution Prevention Plan (SWPPP) in accordance with Section 01 50 00, Temporary Facilities and Controls. A Temporary Soil Erosion and Sediment Control Plan is a component of the SWPPP.
2. A TESC Plan is furnished as part of the Drawings, which helps fulfill part of the plan requirement of the NPDES Permit. This initial TESC Plan, when adopted by Contractor, may be used as the basis of the construction TESC Plan. Additional or revised erosion and sediment control features, not shown on the initial TESC Plan, may be required depending on Contractor's methods of operation and schedule.
3. For each phase of the scheduled work, indicate on the TESC Plan all the BMPs proposed and installed for erosion and sediment control to minimize clearing, stabilize exposed soil, divert or temporarily store flows, limit runoff from exposed areas, and filter transported sediment. Include all temporary slopes, constructed for staging or other reasons, which may not have been identified in the original Contract plans. Refer to the current local jurisdiction's erosion and sediment control manual.

4. Some TESC Plan required elements typically required by NPDES permits:
   a. Narrative Site Description:
      1) Nature of construction activity planned for the Site.
      2) Estimates of total site area and the areas of the Site expected to be disturbed.
      3) Soil types found onsite and their erosion potential.
      4) The types of fill materials to be used.
      5) Timetable for sequence of major construction events.
   b. Site Map:
      1) All areas of development.
      2) Drainage patterns.
      3) Areas of soil disturbance, including pre-development and post-development elevation contours.
      4) Areas used for storage of soils or wastes.
      5) Areas where vegetative practices are to be implemented.
      6) Location of all erosion and sediment control BMP or structures.
      7) Location of all impervious structures and surfaces after project is completed.
      8) Springs, wetlands, and other surface waters located onsite.
      9) Boundaries of the 100-year floodplain, if determined.
      10) Ordinary High Water line, if determined.
      11) Location of storm drainage outfalls to receiving waters, if applicable.
      12) Details of sediment and erosion controls.
      13) Details of detention ponds, storm drain piping, inflow and outflow details.
   c. Required BMPs and Procedures for Erosion Prevention, Runoff Control, and Sediment Control:
      1) Construction entrances and parking areas.
      2) Unpaved site roads such as haul roads.
      3) Hauling saturated soils from the Site.
      4) Water washed from concrete trucks.
      5) Correct installation of erosion and sediment control BMPs.
      6) Prompt maintenance and repair of BMPs.
      7) Clearing and grading practices to minimize area of exposed soil throughout life of the Project.
      8) Schedule of phased clearing operations to limit soils to what can be stabilized.
      9) Vegetative practices, including preservation of existing vegetation, seeding, mulching, and buffer strips.
      10) Preventing erosion of exposed areas.
      11) Diverting flows from exposed slopes.

12) Limiting runoff from exposed areas.
13) Limiting sediment transport within work sites and keeping it from moving off of project areas.
14) Perimeter controls for all clearing and grubbing, both planned and installed.
15) Additional controls for wet season work and temporary work suspensions.
16) Sensitive areas such as wetlands.
17) Offsite material source and waste areas.
18) Dust.
19) Emergency materials stockpiled onsite.
20) Storing flows and filtering sediment.
21) Soil stockpiles.

5. Contractor's construction TESC Plan and implementation schedules must be prepared by a competent individual. Furnish a signed copy of the TESC Plan with individual's name, title, state certifications, and employing firm if different than Contractor's firm.
6. Do not begin any Site activities that have potential to cause erosion or sediment movement until the TESC Plan and implementation schedules are approved by Engineer.
7. Keep a copy of the approved TESC Plan with updated changes onsite during all construction activities. During inactive periods longer than 7 calendar days, keep the TESC Plan onsite or provide a copy to Engineer to retain.
8. Continually update the TESC Plan and schedules as needed for unexpected storm or other events to ensure that sediment-laden water does not leave the construction site. Add approved changes to the TESC Plan no later than 24 hours after implementation.

E. Preventing erosion, and controlling runoff, sedimentation, and non-stormwater pollution, requires Contractor to perform temporary Work items including, but not limited to:

1. Providing ditches, berms, culverts, and other measures to control surface water.
2. Building dams, settling basins, energy dissipaters, and other measures, to control downstream flows.
3. Controlling underground water found during construction.
4. Covering or otherwise protecting slopes until permanent erosion control measures are working.

F. To the degree possible, coordinate this temporary Work with permanent drainage and erosion control work the Contract requires.

G. Engineer may require additional temporary control measures if it appears pollution or erosion may result from weather, nature of materials, or progress on the Work.

H. When natural elements rut or erode the slope, restore and repair damage with eroded material where possible, and remove and dispose of any remaining material found in ditches and culverts. When Engineer orders replacement with additional or other materials, unit Contract prices will cover quantities needed.

I. Install all sediment control devices including, but not limited to, sediment ponds, perimeter silt fencing, or other sediment trapping BMPs prior to any ground disturbing activity. Do not expose more erodible earth than necessary during clearing, grubbing, excavation, borrow, or fill activities without written approval by Engineer. Engineer may increase or decrease the limits based on project conditions. Erodible earth is defined as any surface where soils, grindings, or other materials may be capable of being displaced and transported by rain, wind, or surface water runoff. Cover inactive areas of erodible earth, whether at final grade or not, within specified time period (see [NPDES] Erosion and Sediment Control Permit), using an approved soil covering practice. Phase clearing and grading to maximum extent practical to prevent exposed inactive areas from becoming a source of erosion.

J. Water Management:

1. Manage site water in accordance with approved Dewatering Plan, to comply with state water quality criteria in 35 IAC Sections 302.208 and 302.210. Manage in accordance with the conditions of the water discharge permit-equivalent requirements or approval from local IEPA or authority. If site water management is not subject to regulation for compliance with state water quality standards, manage as follows:
    a. Groundwater. When groundwater is encountered in an excavation, treat and discharge as follows:
        1) When groundwater conforms to Illinois Surface Water Quality Standards in 35 IAC Section 320.208 and 320.210, it may bypass detention and treatment facilities and be routed directly to its normal discharge point at a rate and method that will not cause erosion.
        2) When turbidity of groundwater is similar to turbidity of site runoff, groundwater may be treated using same detention and treatment facilities being used to treat the site runoff and then discharged at a rate that will not cause erosion.
        3) When groundwater turbidity is greater than turbidity of site runoff, treat ground water separately until turbidity is similar to or better than site runoff, and then it may be combined with site runoff and treated as described above.

b. Process Water:
   1) Do not discharge high pH process water or wastewater (non-stormwater) that is generated onsite, including water generated during concrete grinding, rubblizing, washout, and hydrodemolition activities, to waters of the Illinois, including wetlands. Water may be infiltrated upon approval of Engineer. Offsite disposal of concrete process water is subject to approval of Engineer.
   2) Treat all water generated onsite from construction or washing activities that is more turbid than site runoff separately until turbidity is the same or less than site runoff, and then it may be combined with site runoff and treated as described above. Water may be infiltrated upon approval of Engineer.

c. Offsite Water: Prior to disruption of normal watercourse, intercept offsite stormwater and pipe it either through or around the Project Site. This water shall not be combined with onsite stormwater. Discharge offsite water at its preconstruction outfall point preventing an increase in erosion below the site. Submit proposed method for performing this Work in Dewatering Plan per Section 01 50 00, Temporary Facilities and Controls for Engineer's approval.

K. Pollution Control: Use BMPs to prevent or minimize stormwater exposure to pollutants from spills; vehicle and equipment fueling, maintenance, and storage; other cleaning and maintenance activities; and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery, as well as debris, leftover paints, solvents, and glues from construction operations. Implement the following BMPs when applicable:

1. Written spill prevention and response procedures.
2. Employee training on spill prevention and proper disposal procedures.
3. Spill kits in all vehicles.
4. Regular maintenance schedule for vehicles and machinery.
5. Material delivery and storage controls.
6. Training and signage.
7. Covered storage areas for waste and supplies.

L. If Engineer orders the Work suspended, continue to control erosion, pollution, and runoff during the shutdown.

M. Nothing in this section shall relieve Contractor from complying with other Contract requirements.

1.04 SUBMITTALS

A. Informational Submittals:

1. When a TESC Plan is included in the Drawings, either adopt or modify the TESC Plan. Provide a schedule for TESC Plan implementation and incorporate it into Contractor's progress schedule. Obtain Engineer's approval of the TESC Plan and schedule before any Work begins.
2. Modified TESC Plans shall meet all requirements of the applicable jurisdictions.
3. The TESC Plan shall cover all areas that may be affected inside and outside the limits of the Project (including all Owner-provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water).
4. Allow at least 5 working days for Engineer to review any original or revised TESC Plan. Failure to approve all or part of any such Plan shall not make Owner liable to Contractor for any Work delays.

PART 2 PRODUCTS

2.01 CHECK DAMS

A. Specified by Contractor with approval of Engineer.

2.02 COIR LOG

A. Logs made of 100 percent durable coconut (coir) fiber uniformly compacted within woven netting.

B. Netting: Made of bristle coir twine with minimum strength of 80 pounds tensile strength. Nominal 2-inch by 2-inch openings.

C. Log Segments: Maximum length of 20 feet, with a minimum diameter as shown on the Drawings.

D. Log Minimum Density: 7 lbs/cf.

E. Stakes: Untreated softwood species with a notch to secure rope ties.

F. Rope Ties: 1/4-inch diameter commercially available hemp rope.

2.03 COMPOST SOCK

A. Provide socks fabricated from of extra heavy weight biodegradable fabric, with a minimum strand thickness of 5 mils.

B. Fill fabric with Coarse Compost.

C. Diameter: 8 inches minimum.

D. Fabric: Clean, evenly woven, and free of encrusted concrete or other contaminating materials. Shall be free from cuts, tears, broken or missing yarns. Shall be free of thin, open, or weak areas. Shall be free of any type of preservative.

E. Wood Stakes: Untreated softwood species, be 2-inch by 2-inch nominal dimension and 36 inches in length.

2.04 EROSION CONTROL BLANKET (MATTING), BIODEGRADABLE

A. Temporary erosion control blanket shall be made of natural plant fibers. Supply independent test results meeting the following:

Properties	ASTM Test Method	Requirements
Protecting Slopes from Rainfall-Induced Erosion	D6459: Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle.	Maximum C factor of 0.15 using Revised Universal Soil Loss Equation (RUSLE)
Dry Weight per Unit Area	D6475	0.36 lb/sq. yd. minimum
Performance in Protecting Earthen Channels from Stormwater-Induced Erosion	D6460: Test in one soil type. Soil tested shall be loam as defined by the NRCS Soil Texture Triangle.	1.0 lb/sq. ft. minimum
Seed Germination Enhancement	D7322	200 percent minimum
Netting, if present, shall be biodegradable with a life span not to exceed 1 year.		

B. For permanent erosion control blanket, see Section 31 32 00, Soil Stabilization.

2.05 GEOTEXTILE

A. Geotextiles shall consist only of long chain polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters. The material shall be free from defects or tears. Geotextile shall also be free of any treatment or coating which might adversely alter its hydraulic or physical properties after installation. Geotextile properties shall be as specified as described in Table 1 through Table 3.

Table 1
Geotextile for Permanent Erosion Control

Geotextile Property	ASTM Test Method	Geotextile Property Requirements					
		Permanent Erosion Control				Ditch Lining	
		Moderate Survivability		High Survivability			
		Woven	Nonwoven	Woven	Nonwoven	Woven	Nonwoven
AOS	D4751	See Table 2		See Table 2		U.S. No. 30 max.	
Water Permittivity	D4491	See Table 2		See Table 2		0.02 sec^{-1} min.	
Grab Tensile Strength, in machine and x-machine direction	D4632/ D4632M	250 lb min.	160 1b min.	315 lb min.	200 lb min.	250 lb min.	160 lb min.
Grab Failure Strain, in machine and x-machine direction	D4632/ D4632M	15% -50%	≥50%	15% -50%	≥50%	<50%	≥50%
Seam Breaking Strength	D4632/ D4632M	220 lb min.	140 lb min.	270 lb min.	180 lb min.	220 lb min.	140 lb min.
Puncture Resistance	D6241	495 lb min.	310 lb min.	620 lb min.	430 lb min.	495 lb min.	310 lb min.
Tear Strength, in machine and x-machine direction	D4533	80 lb min.	50 lb min.	112 lb min.	79 lb min.	80 lb min.	50 lb min.
Ultraviolet (UV) Radiation Stability	D4355	70% strength retained min., after 500 hours in xenon arc device					

Table 2
Filtration Properties for Geotextile for Permanent Erosion Control

Geotextile Property	ASTM Test Method	Geotextile Property Requirements		
		Class A	Class B	Class C
AOS	D4751	U.S. No. 40 max.	U.S. No. 60 max.	U.S. No. 70 max.
Water Permittivity	D4491	0.7 sec^{-1} min.	0.4 sec^{-1} min.	0.2 sec^{-1} min.

Table 3
Geotextile for Temporary Silt Fence

Geotextile Property	ASTM Test Method	Geotextile Property Requirements	
		Unsupported Between Posts	Supported Between Posts with Wire or Polymeric Mesh
AOS	D4751	U.S. No. 30 max. for silt wovens, U.S. No. 50 for all other geotextile types, U.S. No. 100 min.	
Water Permittivity	D4491	0.2 sec^{-1} min.	
Grab Tensile Strength, in machine and x-machine direction	D4632/ D4632M	180 lb min. in machine direction, 100 lb min. in x-machine direction	100 lb min.
Grab Failure Strain, in machine and x-machine direction	D4632/ D4632M	30% max. at 180 lb or more	
Ultraviolet (UV) Radiation Stability	D4355	70% strength retained min., after 500 hours in xenon arc device	

2.06 GRAVEL FILTER, WOOD CHIP OR COMPOST BERM

A. Rock Material Used for Filter Berms: Clean 3/4-inch rock, with no recycled materials.

B. Wood Chips Used for Wood Chip Berm: As specified in Article Wood Chips and Wood Shavings.

C. Compost Used for Compost Berms: Coarse compost as specified in Article Compost Blanket.

2.07 MULCH

A. Short-Term: Provide independent test results documenting that the mulch meets the requirements in Table 4, Short-Term Mulch Test Requirements.

Table 4
Short-Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion.	ASTM D6459. Test in one soil type. Soil tested shall be sandy loam as defined by the National Resources Conservation Service (NRCS) Soil Texture Triangle.	C Factor = 0.15 maximum using Revised Universal Soil Loss Equation (RUSLE)

B. Moderate-Term: Within 48 hours of application, the Moderate-Term Mulch shall bond with soil surface to create a continuous, absorbent, flexible, erosion-resistant blanket that allows for seed germination and plant growth and conforms to the requirements in Table 5, Moderate-Term Mulch Test Requirements. Provide test results documenting that the mulch meets the requirements in Table 5, Moderate-Term Mulch Test Requirements. Supply independent test results.

Table 5
Moderate-Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion.	ASTM D6459. Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle.	C Factor = 0.05 maximum using Revised Universal Soil Loss Equation (RUSLE)

C. Long-Term:

1. Provide Long-Term Mulch with demonstrated ability:
   a. To adhere to soil and create a blanket-like mass within 2 hours of application.
   b. To bond with the soil surface to create a continuous, porous, absorbent, and flexible erosion-resistant blanket that allows for seed germination and plant growth.
   c. To conform to the requirements in Table 6, Long-Term Mulch Test Requirements.
   d. Provide test results documenting that mulch meets requirements in Table 6, Long-Term Mulch Test Requirements. Supply independent test results.

Table 6
Long-Term Mulch Test Requirements

Properties	Test Method	Requirements
Performance in Protecting Slopes from Rainfall-Induced Erosion.	ASTM D6459. Test in one soil type. Soil tested shall be sandy loam as defined by the NRCS Soil Texture Triangle.	C Factor = 0.01 maximum using Revised Universal Soil Loss Equation (RUSLE)

2.08 PLASTIC COVERING

A. Clear plastic meeting requirements of ASTM D4397 for polyethylene sheeting having a minimum thickness of 6 mils.

2.09 POLYACRYLAMIDE (PAM)

A. Meet ANSI/NSF Standard 60 for drinking water treatment with an AMD content not to exceed 0.05 percent.

B. Anionic, linear, and not cross-linked.

C. Minimum average molecular weight greater than 5 mg/mole and minimum 30 percent charge density.

D. 80 percent active ingredients minimum with moisture content not exceeding 10 percent by weight.

E. Delivered in a dry granular or powder form.

2.10 SEDIMENT CONTROL BARRIERS

A. Specified by Contractor with approval of Engineer. May include Compost Filter Sock or Compost Filter Berm.

2.11 SEEDING

A. See Section 32 92 00, Turf and Grasses.

2.12 SILT (SEDIMENT) FENCE

A. Geotextile: As specified in Article Geotextile.

B. Support Posts: As recommended by manufacturer of geotextile.

C. Fasteners: Heavy-duty wire staples at least 1-inch long, tie wires, or hog rings, as recommended by manufacturer of geotextile.

2.13 STABILIZED CONSTRUCTION ENTRANCE

A. Construct a pad from stone 3 inches to 6 inches in size, placed at least 8 inches deep and not less than 50 feet long.

B. Provide aggregate free of extraneous materials that may cause or contribute to track out.

C. Place separation geotextile under the rock to prevent fine sediment from pumping up into the rock pad. See Article Geotextile for required geotextile properties.

D. Use of constructed or constructed/manufactured steel plates with ribs (such as, shaker/rumble plates or corrugated steel plates) for entrance/exit access is allowable.

2.14 STRAW BALE BARRIER

A. Straw:

1. Air dried condition free of noxious weeds, seeds, and other materials detrimental to plant life. Hay is not acceptable. Provide weed-free documentation:
    a. Certified Weed Free Straw using North American Weed Management Association (NAWMA) standards.
    b. Provide documentation that material is steam or heat treated to kill seeds.
    c. Provide U.S. or state's Department of Agriculture laboratory test reports, dated within 90 days prior to date of application, showing there are no viable seeds in the straw.

B. Straw Mulch: Suitable for spreading with mulch blower equipment.

C. Posts for Straw Bales: 2-inch by 2-inch untreated wood or commercially manufactured metal posts.

2.15 STREET CLEANING

A. Use self-propelled pickup street sweeper(s). Mechanical broom sweepers are not allowed where environmental concerns exist about storm water pollution or air quality.

2.16 TACKIFIERS

A. Biodegradable Hydraulically Applied Erosion Control Products (HECPs) in a dry condition, free of noxious weeds, seeds, chemical printing ink, germination inhibitors, herbicide residue, chlorine bleach, rock, metal, plastic, and other materials detrimental to plant life. Up to 5 percent by weight may be photodegradable material.

B. Suitable for spreading with a hydroseeder.

C. Furnish HECPs premixed by the manufacturer. Under no circumstances will field mixing of additives or components be acceptable.

D. Provide test results, dated within 3 years prior to the date of application, from an independent, accredited laboratory, as approved by Engineer, showing that the product meets the HECP requirements in Table 7.

Table 7
HECP Requirements

Properties	Test Method	Requirements
Acute Toxicity	EPA-821-R-02-012 Methods for Measuring Acute Toxicity of Effluents. Test leachate from recommended application rate receiving 2 inches of rainfall per hour using static test for No-Observed-Adverse-Effect-Concentration (NOEC).	Four replicates are required with no statistically significant reduction in survival in 100 percent leachate for a Daphnid at 48 hours and Oncorhynchus mykiss (rainbow trout) at 96 hours.
Solvents	EPA 8260B	Benzene: < 0.03 mg/kg Methylene chloride: < 0.02 mg/kg Naphthalene: < 5 mg/kg Tetrachloreoethylene: < 0.05 mg/kg Toluene: < 7 mg/kg Trichloroethylene: < 0.03 mg/kg Xylenes: < 9 mg/kg

Table 7
HECP Requirements

Properties	Test Method	Requirements
Heavy Metals	EPA 6020A Total Metals	Antimony: < 4 mg/kg Arsenic: < 6 mg/kg Barium: < 80 mg/kg Boron: < 100 mg/kg Cadmium: < 2 mg/kg Chromium: < 2 mg/kg Copper: < 5 mg/kg Lead: < 5 mg/kg Mercury: < 2 mg/kg Nickel: < 2 mg/kg Selenium: < 10 mg/kg Strontium: < 30 mg/kg Zinc: < 5 mg/kg
Water Holding Capacity	ASTM D7367	900 percent minimum
Organic Matter Content	ASTM D2974	90 percent minimum
Moisture Content	ASTM D2974	15 percent
Seed Germination Enhancement	ASTM D7322	Long-Term: 420 percent minimum Moderate-Term: 400 percent minimum Short-Term: 200 percent minimum

2.17 TIRE WASH FACILITY

A. Specified by Contractor with approval of Engineer. Wheel wash facilities should have a non-erosive base, and a small grade change, 6 inches to 12 inches for a 10-foot-wide pond, to allow sediment to flow to low side of pond to help prevent re-suspension of sediment. A drainpipe with a 2-foot to 3-foot riser should be installed at low side of pond to allow for cleaning and refilling. Pond should be deep enough to hold 14 inches of water after displacement. Alternatively, pressure washing combined with an adequately-sized and adequately-surfaced pad with direct drainage to a 10-foot by 10-foot sump can be very effective.

2.18 WATTLES

A. Cylinders of biodegradable plant material such as weed-free straw, coir, compost, wood chips, excelsior, or wood fiber or shavings encased within biodegradable netting.

B. Diameter: 5 inches minimum.

C. Netting Material: Clean, evenly woven, and free of encrusted concrete or other contaminating materials such as preservatives. Also free from cuts, tears, or weak places with a minimum lifespan of 6 months.

D. Compost Filler: Coarse compost, wood chips, or wood shavings.

E. Wood Stakes: Untreated softwood species, 2-inch by 2-inch nominal dimension and 36 inches in length.

PART 3 EXECUTION

3.01 PREPARATION

A. Engineer's acceptance of the TESC Plan is required prior to starting earth disturbing activities.

B. Include proposed stockpile areas and installation of temporary erosion control devices, ditches, or other facilities in Work phasing plans.

C. Areas designated for Contractor's use during Project may be temporarily developed as specified to provide working, staging, and administrative areas. Include control of sediment from these areas in the TESC Plan.

D. Check Dams: Install check dams as soon as construction will allow, or when designated by Engineer. Contractor may substitute a different check dam, in lieu of what is specified in the Contract, with approval of Engineer. Check dam is a temporary or permanent structure, built across a minor channel. Water shall not flow through check dam structure. Construct check dams to create a ponding area upstream of dam to allow pollutants to settle, with water from increased flows channeled over a spillway in check dam. Construct check dam to prevent erosion in area below spillway. Place check dams perpendicular to flow of water and install in accordance with the Drawings. Extend outer edges up sides of conveyance to prevent water from going around check dam. Provide check dams of sufficient height to maximize detention, without causing water to leave ditch. Place sandbags so that initial row makes tight contact with ditch line for length of dam. Stagger subsequent rows so center of bag is placed over space between bags on previous lift.

E. Coir Log: Install coir logs in accordance with the Drawings.

F. Compost Sock: Exercise care when installing compost socks to ensure method of installation minimizes disturbance of waterways and prevents sediment or pollutant discharge into waterbodies. Lace compost socks together, end-to-end, with coir rope to create a continuous length. Bury loose ends of continuous length 3 feet to 5 feet laterally into the bankslope. Install the upper surface of compost sock parallel to slope. Provide finished grades of a natural appearance with smooth transitions. Secure compost sock with wood stakes or live stakes of species as indicated on the Drawings. Drive stakes into place centered on top of compost sock and spaced 3 feet on center throughout length of sock.

G. Erosion Control Blanket (Matting), Biodegradable: Temporary Erosion Control Blankets are used as an erosion prevention device and to enhance establishment of vegetation. Install erosion control blankets according to manufacturer's recommendations.

1. Erosion control blankets with an open area of 60 percent or greater may be installed prior to seeding and fertilizing. Install blankets with less than 60 percent open space immediately following seeding and fertilizing operation.
2. Select erosion control blanket material for an area based on the intended function; slope or ditch stabilization and Site-specific factors including soil, slope gradient, rainfall, and flow exposure. Do not use erosion Control Blankets on slopes or in ditches that exceed manufacturer's recommendations.
3. For permanent erosion control blanket, see Section 31 32 00, Soil Stabilization.

H. Gravel Filter, Wood Chip, or Compost Berm: Construct filter berms to retain sediment and direct flows.

1. Gravel Filter Berm: 1-foot minimum height. Maintain at this height for entire time berm is in use.
2. Wood Chip Berm: 2-foot minimum height. Maintain at this height for entire time berm is in use.
3. Construct compost berm of course compost in accordance with the detail on the Drawings.

I. Mulch: Furnish, haul, and evenly apply at rates indicated and spread on seeded areas within 48 hours after seeding unless otherwise specified.

1. Distribute straw mulch material with an approved mulch spreader that uses forced air to blow mulch material on seeded areas.
2. Apply wood strand mulch by hand or by straw blower on seeded areas.

3. Hydraulically apply Short-Term Mulch at the rate of 2,500 pounds per acre. May be applied in one lift.
4. Hydraulically apply Moderate-Term Mulch and Long-Term Mulch at the rate of 3,500 pounds per acre with no more than 2,000 pounds applied in any single lift. Mulch may be applied with seed and fertilizer in moist climates. In dry climates, apply seed and fertilizer in a single application followed by mulch application. Provide mulch suitable for application with a hydroseeder.
5. Cover temporary seed applied outside application windows established in Section 32 92 00, Turf and Grasses, with a mulch containing either Moderate-Term Mulch or Long-Term Mulch, as designated by Engineer.
6. Mulch areas not accessible by mulching equipment by approved hand methods.

J. Plastic Covering: Use clear plastic covering to promote seed germination when seeding is performed outside of specified dates. Use black plastic covering for stockpiles or other areas where vegetative growth is unwanted. Place plastic with at least a 12-inch overlap of all seams. Install and maintain plastic cover to prevent water from cutting under the plastic and to prevent cover from blowing open in the wind.

K. Polyacrylamide (PAM): See Tackifiers.

L. Sediment Control Barriers: Install sediment control barriers in accordance with TESC Plan or manufacturer's recommendations in the areas of clearing, grubbing, earthwork, or drainage prior to starting those activities. Maintain sediment control barriers until soils are stabilized.

M. Seeding: See Section 32 92 00, Turf and Grasses.

N. Silt (Sediment) Fence:

1. Silt fence shall be installed in accordance with the Drawings. When backup support is used, use steel wire with a maximum mesh spacing of 2 inches by 4 inches, or plastic mesh as resistant to ultraviolet radiation as the geotextile it supports. Provide wire or plastic mesh with strength equivalent to or greater than as required for unsupported geotextile (for example, 180 pounds grab tensile strength in the machine direction).
2. Attach geotextile to posts and support system using staples, wire, or in accordance with manufacturer's recommendations. Geotextile shall be sewn together at the point of manufacture, or at a location approved by Engineer, to form geotextile lengths as required.
3. Provide wood or steel support posts at sewn seams and overlaps and as shown on the Drawings and necessary to support fence.

4. Wood Posts: Minimum dimensions of 1-1/4-inch by 1-1/4-inch by the minimum length shown on the Drawings.
5. Steel Posts: Minimum weight of 0.90 lb/ft.
6. When sediment deposits reach approximately one-third the height of the silt fence, remove and stabilize deposits.

O. Stabilized Construction Entrance: Construct temporary stabilized construction entrance in accordance with the Drawings, prior to beginning any clearing, grubbing, earthwork, or excavation. When stabilized entrance no longer prevents track out of sediment or debris, either rehabilitate existing entrance to original condition or construct a new entrance.

P. Street Cleaning: Use self-propelled pickup street sweepers whenever required by Engineer to prevent transport of sediment and other debris off Project Site. Provide street sweepers designed and operated to meet air quality standards. Street washing with water will require approval by Engineer. Intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments.

Q. Tackifiers:

1. Mix and apply tackifier in accordance with manufacturer's recommendations. If applied with a hydroseeder, add Short-Term Mulch as a tracer at a rate of 125 pounds to 250 pounds per acre to visibly aid uniform application.
2. Soil Binding Using Polyacrylamide (PAM): Apply PAM on bare soil completely dissolved and mixed in water or applied as a dry powder. Apply dissolved PAM at a rate of not more than 2/3 pound per 1,000 gallons of water per acre. Apply a minimum of 200 pounds per acre of Short-Term Mulch with the dissolved PAM. Dry powder applications may be at a rate of 5 pounds per acre using a hand-held fertilizer spreader or a tractor-mounted spreader.
    a. Apply PAM only to areas that drain to completed sedimentation control BMPs in accordance with the TESC Plan. PAM may be reapplied on actively worked areas after a 48-hour period.
    b. PAM shall not be applied during rainfall or to saturated soils.

R. Tire Wash Facility: When the Contract requires a tire wash (in conjunction with a stabilized entrance), include details for tire wash and method for containing and treating sediment-laden runoff as part of the TESC Plan. All vehicles leaving the Site shall stop and wash sediment from their tires. Keep the water level 12 inches to 14 inches deep. Change wash water a minimum of once per day. Polymers may be used to promote coagulation and flocculation in a closed-loop system. Polyacrylamide (PAM) added to the wheel wash water at a rate of 0.25 pound to 0.5 pound per 1,000 gallons of water increases effectiveness and reduces cleanup time.

S. Wattles: Install wattles as soon as construction will allow or when designated by Engineer. Begin trench construction and wattle installation at base of slope and work uphill. Spread excavated material evenly along the uphill slope and compact using hand tamping or other method approved by Engineer. On gradually sloped or clay-type soils, provide trenches 2 inches to 3 inches deep. On loose soils, in high rainfall areas, or on steep slopes, provide trenches 3 inches to 5 inches deep, or half the thickness of the wattle. Exercise care when installing wattles to minimize disturbance of waterways and prevent sediment or pollutant discharge into waterbodies.

3.02 ADDITIONAL REQUIREMENTS

A. Natural Buffer or Equivalent:

1. Unless natural buffer between the Project Site and receiving waters has previously been eliminated by pre-existing development disturbances, comply with one of the following alternatives if stormwater from construction will discharge to surface water:
   a. Provide a 50-foot, undisturbed natural buffer between construction disturbances and surface water.
   b. Provide an undisturbed natural buffer that is less than 50 feet supplemented by additional erosion and sediment controls, which in combination, achieve a sediment load reduction that is equivalent to a 50-foot buffer.
   c. If it is infeasible to provide an undisturbed natural buffer of any size, implement erosion and sediment controls that achieve a sediment load reduction that is equivalent to a 50-foot buffer.

3.03 MAINTENANCE

A. The ESCP measures described in this specification are minimum requirements for anticipated Site conditions. During the construction period, upgrade these measures as needed to comply with all applicable local, state, and federal erosion and sediment control regulations.

B. Maintain erosion and sediment control BMPs so they properly perform their function until Engineer determines they are no longer needed.

C. Construction activities must avoid or minimize excavation and creation of bare ground during wet weather.

D. The intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments.

E. Inspect BMPs in accordance with the schedule in the Construction Stormwater Discharge Permit(s) or as directed by Engineer.

F. Complete an inspection report within 24 hours of an inspection. Each inspection report shall be signed and identify corrective actions. Document that corrective actions are performed within 7 days of identification. Keep a copy of all inspection reports at the Site or at an easily accessible location.

G. Unless otherwise specified, remove deposits before the depth of accumulated sediment and debris reaches approximately height of BMP. Dispose of debris or contaminated sediment at approved locations. Clean sediments may be stabilized onsite using BMPs as approved by Engineer.

H. Sediment Fence: Remove trapped sediment before it reaches one-third of the above ground fence height and before fence removal.

I. Other Sediment Barriers (such as biobags): Remove sediment before it reaches 2 inches depth above ground height and before BMP removal.

J. Initiate repair or replacement of damaged erosion and sediment control BMPs immediately, and work completed by end of next work day. Significant replacement or repair must be completed within 7 days, unless infeasible.

K. Within 24 hours, remediate any significant sediment that has left construction site. Investigate cause of the sediment release and implement steps to prevent a recurrence of discharge within same 24 hours. Perform in-stream cleanup of sediment according to applicable regulations.

L. At end of each work day, stabilize or cover soil stockpiles or implement other BMPs to prevent discharges to surface waters or conveyance systems leading to surface waters.

M. Temporarily stabilize soils at end of shift before holidays and weekends, if needed. Ensure soils are stable during rain events at all times of year.

N. Initiate stabilization by no later than end of next work day after construction work in an area has stopped permanently or temporarily.

O. Within 14 days of initiating stabilization or as specified in permit, either seed or plant stabilized area (see Section 32 92 00, Turf and Grasses); or apply non-vegetative measures and cover all areas of exposed soil. Seed dry areas as soon as Site conditions allow. Ensure that vegetation covers at least 70 percent of stabilized area. In areas where Contractor's activities have compromised erosion control functions of existing grasses, over-seed existing grass. Non-vegetative measures may include blown straw and a tackifier, loose straw, or an adequate covering of compost mulch. Complete initial stabilization within 7 days if storm water discharges to surface waters impaired for sediment or nutrients, or high quality waters.

P. Provide permanent erosion control measures on all exposed areas. Do not remove temporary sediment control practices until permanent vegetation or other cover of exposed areas is established. However, do remove all temporary erosion control measures as exposed areas become stabilized, unless doing so conflicts with local requirements. Properly dispose of construction materials and waste, including sediment retained by temporary BMPs.

3.04 REMOVAL

A. When Engineer determines that an erosion control BMP is no longer required, remove BMP and all associated hardware from the Project limits. When materials are biodegradable, Engineer may approve leaving temporary BMP in place.

B. Permanently stabilize all bare and disturbed soil after removal of erosion and sediment control BMPs. Dress sediment deposits remaining after BMPs have been removed to conform to existing grade. Prepare and seed graded area. If installation and use of erosion control BMPs have compacted or otherwise rendered soil inhospitable to plant growth, such as construction entrances, take measures to rehabilitate soil to facilitate plant growth. This may include, but is not limited to, ripping the soil, incorporating soil amendments, or seeding with specified seed.

3.05 MEASUREMENT AND PAYMENT

A. Check Dams will be measured per linear foot one time only along the completed check dam. Unit Contract Price per linear foot for Check Dam shall be full pay for all equipment, labor, and materials to perform the Work as specified, including installation, removal, and disposal at an approved disposal site. No additional measurement will be made for check dams required to be rehabilitated or replaced as a result of wear or improper installation.

B. Coir Log will be measured by linear foot along ground line of completed installation. Unit Contract Price per linear foot for Coir Log shall be full pay for all equipment, labor, and materials to perform the Work as specified, including installation, removal, and disposal at an approved disposal site.

C. Compost Sock will be measured by linear foot. Unit Contract Price for Compost Sock shall include removal and disposal of compost sock fabric if photodegradable fabric is not used.

D. Erosion Control Blanket (matting) will be measured by square yard along ground slope line of surface area covered and accepted. Unit Contract price per square yard for Erosion Control Blanket shall be full pay for all costs to complete the specified Work.

E. ESC Lead will be measured per day for each day that an inspection is made and a report is filed.

F. Gravel Filter, Wood Chip, or Compost Berm will be measured by linear foot along ground line of completed installation. Unit Contract Price per linear foot of berm shall be full pay for all equipment, labor, and materials to perform the Work as specified, including installation, removal, and disposal at an approved disposal site.

G. Mulch will be measured by the acre by ground slope measurement or through use of design data.

H. Natural Buffer or Equivalent: No additional payment will be made for providing a Natural Buffer or Equivalent on the Project Site.

I. Plastic Covering will be measured by the square yard along ground slope line of surface area covered and accepted. Unit Contract Price per square yard for Plastic Covering shall be full pay for all equipment, labor, and materials to perform the Work as specified, including removal and disposal at an approved disposal site.

J. Polyacrylamide (PAM). See Tackifiers.

K. Sediment Control Barrier will be measured by linear foot along ground line of completed barrier.

L. Seeding: See Section 32 92 00, Turf and Grasses.

M. Silt (Sediment) Fence will be measured by linear foot along ground line of completed installation.

N. Stabilized Construction Entrance will be measured by square yard for each entrance constructed.

O. Street Cleaning will be measured by the hour for actual time spent cleaning pavement, as authorized by Engineer. Time to move equipment to or from the area on which street cleaning is required, will not be measured.

P. Tackifiers (Polyacrylamide) will be measured by the acre by ground slope measurement or calculated by use of design data. Unit Contract Price per acre for Tackifier shall be full payment for all costs incurred to complete the Work.

Q. Tire Wash facility will be measured per each for each wash installed. Unit Contract Price per each for tire wash shall include all costs associated with constructing, operating, maintaining, and removing the tire wash.

R. Wattles will be measured by the linear foot.

S. Erosion Control will be measured and paid on a lump sum basis. Erosion Control includes:

1. Providing the ESC Lead.
2. Developing, revising, and documenting TESC Plan.
3. Mobilization.
4. Monitoring activities.
5. Furnishing, stockpiling, protecting, restocking, and removing emergency materials.
6. Preparing Project for winter shutdown.
7. Inspecting, maintaining, and removing erosion control devices.
8. Restoring, mulching, tacking, and seeding all disturbed ground, work, and storage areas not otherwise covered.

T. No separate or additional payment will be made for:

1. Removing and disposing of sediment build-up behind sediment fences and sediment barriers.
2. Removing and reinstalling required appurtenances to modify temporary slope drains as the embankment slopes are changed.
3. Constructing and removing temporary slope berms.
4. Applying dust control.
5. Erosion control for work outside construction limits including, but not limited to, borrow pits, haul roads, disposal sites, and equipment storage sites.

U. When only Erosion Control is listed in the Contract Schedule of Items, no separate or additional payment will be made for modifications or additions to the BMPs that become necessary for permit compliance during construction.

END OF SECTION

SECTION 01 77 00
CLOSEOUT PROCEDURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational Submittals:

1. Submit prior to application for final payment.
   a. Record Documents: As required in General Conditions.
   b. Special bonds, Special Guarantees, and Service Agreements.
   c. Consent of Surety to Final Payment: As required in General Conditions.
   d. Releases or Waivers of Liens and Claims: As required in General Conditions.
   e. Releases from Agreements.
   f. Final Application for Payment: Submit in accordance with procedures and requirements stated in Section 01 29 00, Payment Procedures.
   g. Extra Materials: As required by individual Specification sections.

1.02 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.
2. Accuracy of Records:
   a. Coordinate changes within record documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change.
   b. Purpose of Project record documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.
3. Make entries within 24 hours after receipt of information that a change in the Work has occurred.
4. Prior to submitting each request for progress payment, request Engineer's review and approval of current status of record documents. Failure to properly maintain, update, and submit record documents may result in a deferral by Engineer to recommend whole or any part of Contractor's Application for Payment, either partial or final.

1.03 RELEASES FROM AGREEMENTS

A. Furnish Owner written releases from property owners or public agencies where side agreements or special easements have been made, or where Contractor's operations have not been kept within the Owner's construction right-of-way.

B. In the event Contractor is unable to secure written releases:

1. Inform Owner of the reasons.
2. Owner or its representatives will examine the Site, and Owner will direct Contractor to complete the Work that may be necessary to satisfy terms of the side agreement or special easement.
3. Should Contractor refuse to perform this Work, Owner reserves right to have it done by separate contract and deduct cost of same from Contract Price, or require Contractor to furnish a satisfactory bond in a sum to cover legal Claims for damages.
4. When Owner is satisfied that the Work has been completed in agreement with Contract Documents and terms of side agreement or special easement, right is reserved to waive requirement for written release if: (i) Contractor's failure to obtain such statement is due to grantor's refusal to sign, and this refusal is not based upon any legitimate Claims that Contractor has failed to fulfill terms of side agreement or special easement, or (ii) Contractor is unable to contact or has had undue hardship in contacting grantor.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 MAINTENANCE OF RECORD DOCUMENTS

A. General:

1. Promptly following commencement of Contract Times, secure from Engineer at no cost to Contractor, one complete set of Contract Documents. Drawings will be full size.
2. Label or stamp each record document with title, "RECORD DOCUMENTS," in neat large printed letters.
3. Record information concurrently with construction progress and within 24 hours after receipt of information that change has occurred. Do not cover or conceal Work until required information is recorded.

B. Preservation:

1. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
2. Make documents and Samples available at all times for observation by Engineer.

C. Making Entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe change by graphic line and note as required.
    a. Color Coding:
        1) Green when showing information deleted from Drawings.
        2) Red when showing information added to Drawings.
        3) Blue and circled in blue to show notes.
2. Date entries.
3. Call attention to entry by "cloud" drawn around area or areas affected.
4. Legibly mark to record actual changes made during construction, including, but not limited to:
    a. Depths of various elements of foundation in relation to finished first floor data if not shown or where depth differs from that shown.
    b. Horizontal and vertical locations of existing and new Underground Facilities and appurtenances, and other underground structures, equipment, or Work. Reference to at least two measurements to permanent surface improvements.
    c. Location of internal utilities and appurtenances concealed in the construction referenced to visible and accessible features of the structure.
    d. Locate existing facilities, piping, equipment, and items critical to the interface between existing physical conditions or construction and new construction.
    e. Changes made by Addenda and Field Orders, Work Change Directive, Change Order, and Engineer's written interpretation and clarification using consistent symbols for each and showing appropriate document tracking number.
5. Dimensions on Schematic Layouts: Show on record drawings, by dimension, the centerline of each run of items such as are described in previous subparagraph above.
    a. Clearly identify the item by accurate note such as "cast iron drain," "galv. water," and the like.
    b. Show, by symbol or note, vertical location of item ("under slab," "in ceiling plenum," "exposed," and the like).
    c. Make identification so descriptive that it may be related reliably to Specifications.

3.02 FINAL CLEANING

A. At completion of the Work or of a part thereof and immediately prior to Contractor's request for certificate of Substantial Completion; or if no certificate is issued, immediately prior to Contractor's notice of completion, clean entire Site or parts thereof, as applicable.

1. Leave the Work and adjacent areas affected in a cleaned condition satisfactory to Owner and Engineer.
2. Remove grease, dirt, dust, paint or plaster splatter, stains, labels, fingerprints, and other foreign materials from exposed surfaces.
3. Repair, patch, and touch up marred surfaces to specified finish and match adjacent surfaces.
4. Decontaminate sidewalks, loading areas, and others contiguous with principal structures.
5. Rake clean all other surfaces.
6. Remove snow and ice from access to buildings.
7. Leave water courses, gutters, and ditches open and clean.

B. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

END OF SECTION

SECTION 02 24 00
DELINEATION OF WETLANDS AND OTHER WATERS OF THE UNITED STATES

PART 1 GENERAL

1.01 SUMMARY

A. This section describes work necessary to delineate wetlands across the Facility Area (FA) and prepare a recommendation for a US Army Corps of Engineers (USACE) Jurisdictional Determination of whether the wetlands are regulated under the Clean Water Act (CWA) Section 404. The work is to be performed following the protocol and methods in the USACE *Wetlands Delineation Manual Wetlands Research Program Technical Report Y-87-1 (1987 Manual), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0), the USACE Jurisdictional Determination Form Instructional Guidebook, May 30, 2007) (JD Guidebook)* and any USACE St. Louis District requirements. The work also includes an optional task for preparation of a Substantive Requirements Document (SRD) for compliance with USACE Nationwide Permit 38 Cleanup of Toxic and Hazardous Waste.

1.02 DRAWINGS

A. US Fish and Wildlife Service National Wetlands Inventory (NWI) of mapped wetlands for the site is included as Attachment A. Note that additional wetlands may appear on the NWI mapping depending on the scale. NWI is not designed for and is not suitable for making a CWA 404 delineation and determinations; a field delineation and site-specific recommendations about the field results is required.

B. The survey is to be performed within the entire boundary of the FA.

1.03 DEFINITIONS

A. Wetland: The USACE (Federal Register 1982) and the EPA (Federal Register 1980) jointly define wetlands as: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Except in certain situations defined in the *1987 Manual*, evidence of a minimum of one positive wetland indicator from each parameter (hydrology, soil, and vegetation) must be found in order to make a positive wetland determination.

1. Diagnostic Environmental Characteristics. Wetlands have the following general diagnostic environmental characteristics:
   a. Vegetation: The prevalent vegetation consists of macrophytes that are typically adapted to areas having hydrologic and soil conditions described in a above. Hydrophytic species, due to morphological, physiological, and/or reproductive adaptation(s), have the ability to grow, effectively compete, reproduce, and/or persist in anaerobic soil conditions. Indicators of vegetation associated with wetlands are listed in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0).*
   b. Soil: Soils are present and have been classified as hydric, or they possess characteristics that are associated with reducing soil conditions. Indicators of soils developed under reducing conditions are listed in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0, as supplemented by the Field Indicators of Hydric Soils, version 8.1, available at* https://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/use/hydric/*)*
   c. Hydrology: The area is inundated either permanently or periodically at mean water depths less than or equal to 6.6 ft, or the soil is saturated to the surface at some time during the growing season of the prevalent vegetation. Indicators of hydrologic conditions that occur in wetlands are listed in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0).*

1.04 ACTION SUBMITTALS

A. Work Plan Submittal: In the Work Plan described in Section 01 11 00, Summary of Work, include a description of the approach to the wetland delineation, a map showing the areas to be included in the field survey, and a schedule for performing the delineation and associated reports.

B. Technical Report of Wetlands Survey:

1. Describe the delineation methodology and results of the delineation including USACE field data sheets, mapping developed from GPS data collection, and completion of all forms in the referenced guidance
2. Representative Photos, labeled.
3. Electronic GIS shape files, to include boundaries of each feature and paired wetland/upland boundary points for each feature (depending on size and shape, some features may require multiple paired points).

4. Jurisdictional Determination Form: Jurisdictional Determination Form per the referenced guidance, including a recommendation, and at a minimum, Background Information, Summary of Findings, CWA Analysis, and Data Sources.

C. NWP 38 Substantive Requirements Document (if regulated wetlands will be disturbed): Contractor will prepare a Substantive Requirements Document documenting how the remediation project will address each requirement in NWP 38 Cleanup of Toxic and Hazardous Waste.

1.05 SEQUENCING AND SCHEDULING

A. Refer to Section 01 31 13, Project Coordination, for specific milestone dates and sequencing and scheduling constraints.

PART 2 PRODUCTS

2.01 HIGH VISIBILITY FLAGS

A. All delineations will include high-visibility flags, sequentially numbered for each identified feature with a unique alphanumeric indicating the feature on each flag followed by the sequence from 1 to the final flag for the feature. The final flag for each feature also will include the word “END”.

PART 3 EXECUTION

3.01 GENERAL

A. Field to survey to identify and delineate potential wetlands, waters, and other regulated areas. The work is to be performed following the protocols and methods in the USACE *Wetlands Delineation Manual Wetlands Research Program Technical Report Y-87-1 (1987 Manual*) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0*).

B. Record the location of wetlands, waters, and other regulated areas using a handheld GPS unit with sub-meter accuracy. Record pertinent wetland and waters data and take representative photographs of environmental resources identified. Note any observed connections with potential underground water conduits such as drainage pipes.

C. Collect data needed to prepare a recommendation for a US Army Corps of Engineers (USACE) Jurisdictional Determination of whether the wetlands are regulated under the Clean Water Act (CWA) Section 404. The work is to be performed following the protocol and methods in the USACE *Jurisdictional Determination Form Instructional Guidebook, May 30, 2007) (JD Guidebook*) and any USACE St. Louis District requirements.

3.02 LIMITS

A. Refer to Attachment Property Boundary and National Wetlands Inventory Map.

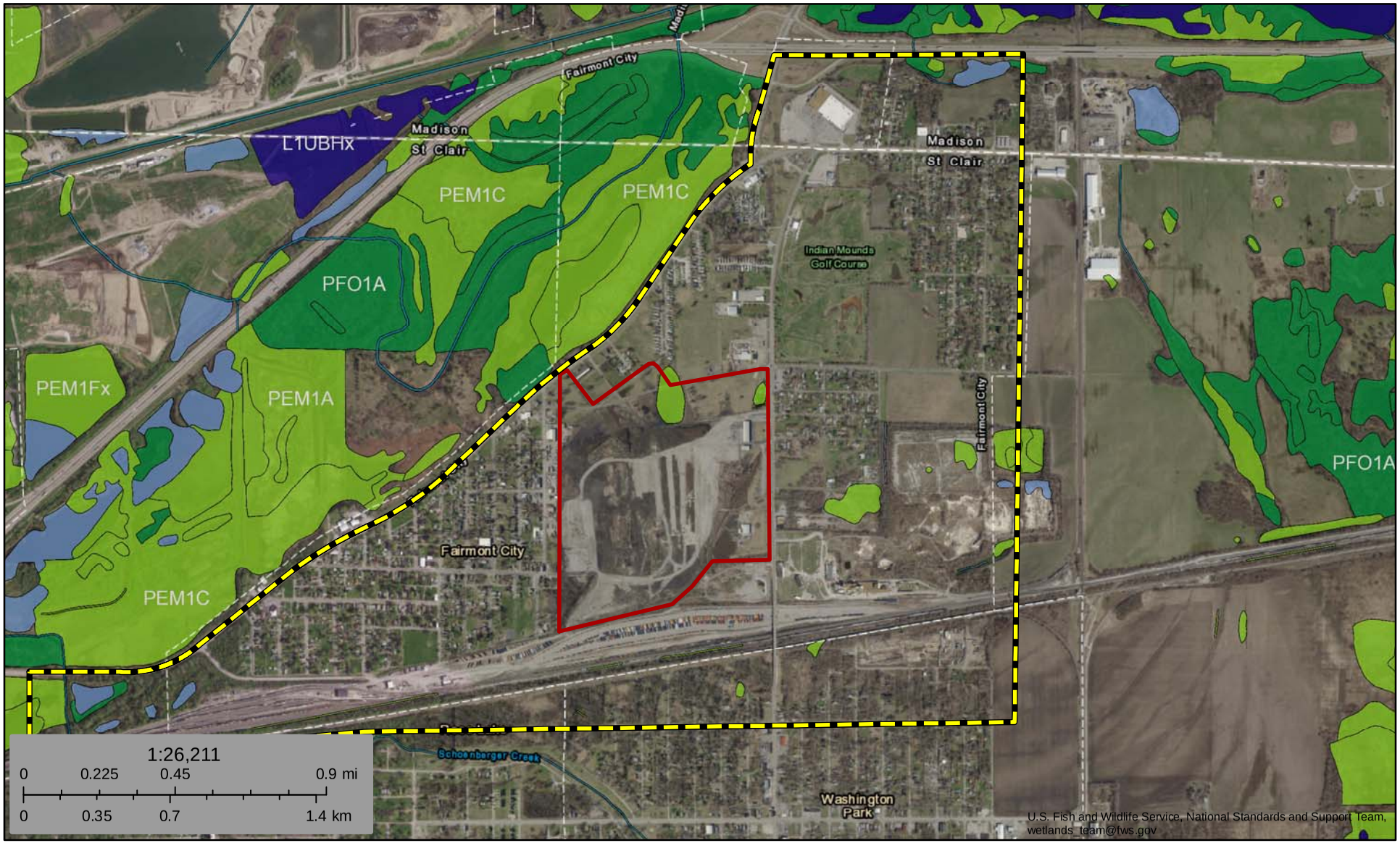
3.03 SUPPLEMENTS

A. Attachment A – Property Boundary and National Wetlands Inventory Map.

END OF SECTION

U.S. Fish and Wildlife Service
National Wetlands Inventory

Old American Zinc Plant - NWI Entire Site



June 7, 2018

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine
- Facility Area Boundary
- Surrounding Properties Boundary (Approximate)

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

National Wetlands Inventory (NWI)
This page was produced by the NWI mapper

SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 DEFINITIONS

A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.

B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.

C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2-inch caliper to a depth of 6 inches below subgrade.

D. Scalping: Removal of sod without removing more than upper 3 inches of topsoil.

E. Stripping: Removal of topsoil remaining after applicable scalping is completed.

F. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.02 SUBMITTALS

A. Action Submittals: Drawings clearly showing clearing, grubbing, and stripping limits.

1.03 QUALITY ASSURANCE

A. Obtain Engineer’s approval of staked clearing, grubbing, and stripping limits, prior to commencing clearing, grubbing, and stripping.

1.04 SCHEDULING AND SEQUENCING

A. Prepare Site only after adequate erosion and sediment controls are in place. Limit areas exposed uncontrolled to erosion during installation of temporary erosion and sediment controls to maximum of 5 acres.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Clear, grub, and strip entire site within limits shown or specified.

B. Do not injure or deface vegetation that is not designated for removal.

C. Clearing, grubbing, and removal of any vegetation, trees, or structures that may provide migratory bird habitat will be performed between September 11 and March 31 (outside of the migratory bird nesting season), over the entirety of the FA. If tree clearing cannot be completed within that time frame, the Migratory Bird Field Assessment and Nest Clearing Protocol in Supplement A will be completed. For consistency with USFWS guidelines for protecting the endangered Indiana bat, removal of mature trees greater than 4-inch diameter will be further restricted during April 1 through September 30 If mature tree removal cannot be conducted outside that timeframe, potential roost trees will be visually assessed. If no bats are observed, clearing can commence. If bats are observed, tree removal will be postponed until after October 1, to the extent practicable.

3.02 LIMITS

A. Project limits are shown on the Contract Drawings.

B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 CLEARING

A. Clear areas within limits shown or specified.

B. Fell trees so that they fall away from facilities and vegetation not designated for removal.

C. Cut stumps not designated for grubbing to within 6 inches of ground surface.

D. Cut off shrubs, brush, weeds, and grasses to within 2 inches of ground surface.

3.04 GRUBBING

A. Grub areas within limits shown or specified.

3.05 SCALPING

A. Do not remove sod until after clearing and grubbing is completed and resulting debris is removed.

B. Scalp areas within limits shown or specified.

3.06 STRIPPING

A. Do not remove topsoil until after scalping is completed.

B. Strip areas within limits to minimum depths shown or specified. Do not remove subsoil with topsoil.

C. Stockpile strippings, meeting requirements of Section 32 91 13, Soil Preparation, for topsoil, separately from other excavated material.

3.07 DISPOSAL

A. Clearing and Grubbing Debris:

1. Dispose of debris offsite.
2. Burning of debris onsite will not be allowed.
3. Woody debris may be chipped. Chips may be sold to Contractor's benefit or used for landscaping onsite as mulch or uniformly mixed with topsoil, provided that resulting mix will be fertile and not support combustion. Maximum dimensions of chipped material used onsite shall be 1/4 inch by 2 inches. Dispose of chips that are unsaleable or unsuitable for landscaping or other uses with unchipped debris.
4. Root balls of trees shall be chipped and/or pulverized and disposed of in the Consolidation Area.

B. Scalpings: As specified for clearing and grubbing debris.

C. Strippings:

1. Dispose of strippings that are unsuitable for topsoil or that exceed quantity required for topsoil offsite.
2. Stockpile topsoil in sufficient quantity to meet Project needs. Dispose of excess strippings as specified for clearing and grubbing.

3.08 SUPPLEMENTS

A. The supplements listed below, following “End of Section”, are part of this specification.

1. Construction Environmental Checklist: Pre-Work Migratory Bird Field Assessment.
2. Old American Zinc Superfund Site Nest Clearing Protocol.

END OF SECTION

Construction Environmental Checklist

Pre-Work Migratory Bird Field Assessment
Old American Zinc

Date of Assessment:	
Site:	

It is illegal to violate the Migratory Bird Treaty Act, which is fully prosecutable with civil and criminal penalties.

Name of Person Conducting Assessment:	**Company Name:**	**Time of Assessment:**
Section of Property Being Assessed:	**Area Marked on Figure?** **YES No**	**Planned Construction Activity:**
Description of Vegetation Present:	**Is vegetation to be removed? Yes or No**	**Is vegetation marked on construction documents? Y / N**

The following checklist is to help the project protect migratory birds by surveying the area prior to beginning any construction, land clearing or vegetation removal work between April 1 to September 10 of each year for most species and varies by location (note bald eagles may nest year-round). Walk all areas prior to land disturbing activities, to identify whether any birds flush from the ground or trees when approached. If a bird flushes, look for a nest in that vicinity.

Live Species Observed?		**# of Individuals Observed**	**Is it breeding here?**		**Behavior Observed**	**Habitat and Notes**
Yes	**No**		**Yes**	**No**		

If a nest is present and not active (i.e., no eggs, no chicks, no adult birds, etc.), the nest may be removed as long as it will not result in the accidental death or injuring of a migratory bird or eggs. Nest removal helps to prevent migratory birds from nesting or returning to the area.

Nests Present?		**Nest Location**					**Is Nest Active?**		**If No, has Nest been Removed?**	
Yes	**No**	**Tree**	**Shrub**	**Ground**	**Utility Pole**	**Other (specify)**	**Yes**	**No**	**Yes**	**No**

If an active nest is present, the nest must be protected until the chicks fledge the nest (duration is dependent upon the species) ***If found on-site, do not approach or harass the bird. Immediately call the Owner's Representative and establish a no-entry zone around the bird nest.***

Circle all the Protection Measures Implemented		
Work Activity Delayed	Area Marked and Roped Off	Fencing/Barrier installed
Vegetative Buffer Maintained	Field Disturbance in Area Minimized	Buffer Zone Established

Additional measures or actions taken: _____

Comments/Findings: _____

_____

If active bird nests are in or near the construction site, the following specific situations are those most likely to be encountered during construction

- **Blown-down nest (after storm events):** if the nest is relatively undamaged and the young birds or eggs are unharmed, replace the nest into the tree/shrub from which it fell or in a nearby tree/shrub. The parents should continue to attend to the nest. A badly damaged nest may be replaced into a strawberry basket or other appropriately sized basket before placement in a tree/shrub. Note: it is a common fallacy that birds reject their young if they have acquired a human scent. However, excessive handling should be avoided none-the-less.
- **Grounded Baby Birds:** Frequently, birds seen hopping on the ground begging for food do not require your assistance. It is common for birds to fledge from the nest before they are fully feathered or flight-ready. They will be fed on the ground for a day or two until they are able to fly, and then may fly with a parent until able to forage on their own. Usually, if the grounded bird is a healthy fledgling, you will see the parent attending it or foraging nearby. Careful observation should help you make a correct determination. If the bird is in the road, place it under a nearby bush. Never unnecessarily handle or move the fledgling from the area where it was found. Baby blue jays are slow to mature, so the fledgling stage will generally take longer for them.

  If the bird is tiny and not feathered, it is likely a 'nestling' that has fallen from its nest. If you can find the nest, put the nestling in the nest and avoid the area. If you cannot find the nest, line a small box with tissue and suspend from a branch or put it on the ground near where its nest is believed to be located and avoid the area.

If injured wildlife or bird is found, call the Owner's Representative. Also call the West-Central Region 4 Illinois Department of Natural Resources District Wildlife Biologist Carl Handel (618) 295-2877. For all bird injuries or deaths during construction, contact the USFWS Marion field office at 618-997-3344, ext. 345.

Draw a figure to identify area assessed and location of Any Active Nests

Old American Zinc Superfund Site
Nest Clearing Protocol

The specifications will require that the construction manager retain a biologist with competency in migratory bird identification if trees or shrubs are being removed between April 1 and September 10. The following protocol and checklist will be in the project specifications:

Shrubs/Small Trees to be Removed by Excavator

1. Approach and note if any birds leave the shrub/tree.
2. Examine the shrub/tree to determine if there are any nests present on branches or ground.
3. If a nest is present and has eggs or live young birds in it, take a photo without disturbing the nest, and call the Owner's Representative who will consult with a biologist. Do not remove the nest or birds until directed by appropriate Owner Representative's supervision.
4. If no nest is present or one is present and no eggs or live birds are in it then proceed to remove the shrub/tree.

Large Tree to be Removed by Cutting

1. Approach and note if any birds leave the tree.
2. Move into first position for cutting and determine if there are any nests or cavities present .
3. If a nest or cavity is present, listen to determine if any live birds can be detected.
4. Take a picture of the nest and send it with any related field notes to the Project construction manager. Then attempt to visually detrmine if live mature or young birds or eggs are present. Use the nest guide to determine the type of bird
5. Call the Owner's Representative. Do not remove the nest, eggs, or birds until directed by appropriate Owner Representative's supervision.
6. If no nest or cavity is present or if no live birds are present then proceed to trim in that area as prescribed.

Move to the next cutting position and repeat the steps.

If ANY nests with live unfledged birds are identified during cutting or vegetation removal, stop work at that area and call the Owner's Representative. Work may proceed in other areas that have no eggs or live unfledged birds present.

SECTION 31 23 13
SUBGRADE PREPARATION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 (600 kN-m/m^3)).
   b. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).
   c. D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.02 DEFINITIONS

A. Optimum Moisture Content: As defined in Section 31 23 23, Fill and Backfill.

B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.

C. Relative Compaction: As defined in Section 31 23 23, Fill and Backfill.

D. Relative Density: As defined in Section 31 23 23, Fill and Backfill.

E. Subgrade: Layer of existing soil after completion of clearing, grubbing, scalping of topsoil prior to placement of fill, roadway structure or base for floor slab.

F. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

1.03 SEQUENCING AND SCHEDULING

A. Complete applicable Work specified in Sections 02 41 00, Demolition; 31 10 00, Site Clearing; and 31 23 16, Excavation, prior to subgrade preparation.

B. Contractor must complete the cone penetration test (CPT) survey grid prior to subgrade approval.

1. CPT survey grid and coordinates are shown in the contract drawings.
2. CPT logs and results shall be provided to Owner's Representative for approval.

1.04 QUALITY ASSURANCE

A. Notify Engineer when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Prepare subgrade when unfrozen and free of ice and snow.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.

B. Bring subgrade to proper grade and cross-section and uniformly compact surface.

C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.

D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 COMPACTION

A. Under General Site Fill: Two passes with a three-wheeled power roller weighing approximately 10 tons.

B. Within Consolidation Area: Compact upper 6 inches to minimum of 98 percent relative compaction as determined in accordance with ASTM D698.

3.03 MOISTURE CONDITIONING

A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.

B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

3.04 TESTING

A. Proof-roll subgrade with equipment specified in Article Compaction to detect soft or loose subgrade or unsuitable material, as determined by Engineer.

B. Nuclear methods (ASTM D6938) shall be used to verify compaction in consolidation area.

3.05 CORRECTION

A. Soft or Loose Subgrade:

1. Adjust moisture content and recompact, or
2. Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23, Fill and Backfill.

B. Unsuitable Material: Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material from the excavation, as specified in Section 31 23 23, Fill and Backfill.

END OF SECTION

SECTION 31 23 16
EXCAVATION

PART 1 GENERAL

1.01 DEFINITIONS

A. Common Excavation: Removal of material not classified as rock excavation.

B. Influence Zone of a Structure or Pavement to be Protected: Bounded by a line extending 10 feet horizontally from existing grade at the outer edge of the structure or pavement, and then extending downward at a slope of 2H:1V away from the structure or pavement.

1.02 SUBMITTALS

A. Informational Submittals:

1. Excavation Plan, Detailing:
   a. Methods and sequencing of excavation.
   b. Proposed locations of stockpiled excavated material.
   c. Proposed onsite and offsite spoil disposal sites.
   d. Numbers, types, and sizes of equipment proposed to perform excavations.
   e. Anticipated difficulties and proposed resolutions.
   f. Reclamation of onsite spoil disposal areas.
   g. Provide methods and design for Temporary Excavation Support Systems where excavations are required with the Influence Zone of any structure or pavement to be protected, as defined in paragraph 1.01.
   h. The excavation plan shall be prepared and sealed by the Contractor's professional engineer licensed in the State of Illinois.

1.03 QUALITY ASSURANCE

A. Provide adequate survey control to avoid unauthorized over-excavation.

1.04 WEATHER LIMITATIONS

A. Material excavated when frozen or when air temperature is less than 32 degrees F shall not be used as fill or backfill until material completely thaws.

B. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.05 SEQUENCING AND SCHEDULING

A. Clearing, Grubbing, and Stripping: Complete applicable Work specified in Section 31 10 00, Site Clearing, prior to excavating.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum.

B. Over-excavation of slag is permitted if slag is present below the lines and grades shown on the Drawings.

1. Contractor shall notify Engineer if slag is present below lines and grades shown.
2. Over-excavation of slag shall occur until all visual evidence of slag is removed.

C. If unidentified archaeological deposits are uncovered during excavation, protocol will be implemented as outlined in the Unanticipated Discovery Plan (UDP) (Appendix H of Basis of Design Report) to protect archaeological and cultural resources.

3.02 SLAG/RESIDUALS EXCAVATION

A. Excavation of slag shall be completed, regardless of the type, nature, or condition of the materials encountered until visual evidence of contamination is gone.

1. Engineer shall be notified if slag is present below lines and grades shown on the Drawings.

B. Remove concrete foundations and obstructions as encountered during excavation over the entire Facility Area.

1. Foundations shall be removed completely, even below designed excavation depth.
2. A concrete pulverizer shall be used to pulverize concrete into manageable sized pieces prior to stockpiling.

C. Tarry material may be present mixed with demolition debris in localized areas across the footprints of former smelter buildings. Tarry materials were previously tested and found to be non-hazardous, therefore such material will be disposed of in the consolidation area.

D. Install Temporary Excavation Support Systems per the Excavation Plan.

3.03 COMMON EXCAVATION

A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

B. Material excavated shall be visually free of slag contamination.

C. Material shall be placed in stockpiles on site to be used either as general site fill or low-permeability cover material.

3.04 STOCKPILING EXCAVATED MATERIAL

A. Stockpile excavated material until material is needed:

1. Slag and pulverized concrete foundations shall be placed on or adjacent to the existing slag stockpile on the northern portion of the site.
2. Unimpacted excavated material shall be stockpiled either in general fill stockpile or clay stockpile as shown on the Drawings.
    a. Clay stockpile material shall be used for the low-permeability cover system. Only clay meeting the performance requirements shall be stockpiled in this area.
    b. General fill stockpile material shall be used for general site fill and may consist of clay or other materials as discussed in Section 31 23 23, Fill and Backfill.

B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.

C. Confine stockpiles to areas shown on the Drawings. Do not obstruct roads or streets.

D. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.

E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.05 DISPOSAL OF CONSOLIDATION MATERIAL

A. Dispose of excavated materials, which are unsuitable or not needed for fill or backfill, in the consolidation area.

B. Dispose of debris resulting from removal of concrete foundations within the consolidation area.

C. Dispose of tarry material: Nonhazardous tarry materials shall be placed in the consolidation area with slag and pulverized concrete.

D. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 31 10 00, Site Clearing, for clearing and grubbing debris.

END OF SECTION

SECTION 31 23 23
FILL AND BACKFILL

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. C117, Standard Test Method for Materials Finer Than 75-Micrometers (No. 200) Sieve in Mineral Aggregates by Washing.
   b. C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
   c. D75, Standard Practice for Sampling Aggregates.
   d. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).
   e. D1556, Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
   f. D1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).
   g. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
   h. D4318, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
   i. D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
   j. D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
2. Illinois Environmental Protection Agency:
   a. Illinois Administrative Code (IAC) Title 35, Part 742, Tiered Approach to Corrective Action Residential Criteria, Appendix B, Table A.
   b. IAC Title 35, Part 1100 Illinois Clean Fill Regulations.
3. Illinois Department of Transportation (IDOT): Manual of Test Procedures for Materials, Illinois Test Procedure 11, Materials Finer than No. 75 µm, (No. 200) Sieve in Mineral Aggregates by Washing.

1.02 DEFINITIONS

A. Relative Compaction:

1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D698.
2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Engineer.

B. Optimum Moisture Content:

1. Determined in accordance with ASTM Standard specified to determine maximum dry density for relative compaction.
2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.

C. Relative Density: Calculated in accordance with ASTM D4254 based on maximum index density determined in accordance with ASTM D4253 and minimum index density determined in accordance with ASTM D4254.

D. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.

E. Completed Course: A course or layer that is ready for next layer or next phase of Work.

F. Lift: Loose (uncompacted) layer of material.

G. Well-Graded:

1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.

H. Borrow Material: Material from required excavations or from designated borrow areas on or near Site.

I. Selected Backfill Material: Materials available onsite that Engineer determines to be suitable for specific use.

J. Imported Material: Materials obtained from sources offsite, suitable for specified use.

1.03 SUBMITTALS

A. Action Submittals:

1. A table describing borrow sources and a site drawing will be submitted identifying location(s) of borrow areas, and of any samples with respect to the specific borrow area at the borrow source. This will be provided by the Contractor within 5 days from Notice of Award. Owner or Owner's Representative will review and approve the selected borrow source and all analytical results prior to import of backfill and/or topsoil to the site.
2. Samples: Imported material taken at source.

B. Wetlands restoration plan, if required upon completion of work in Section 02 24 00, Delineation of Wetlands and Other Waters of the United States.

C. Informational Submittals:

1. Manufacturer's data sheets for compaction equipment.
2. Certified test results from independent testing agency.

1.04 QUALITY ASSURANCE

A. Notify Engineer when:

1. Soft or loose subgrade materials are encountered wherever embankment or site fill is to be placed.
2. Fill material appears to be deviating from Specifications.

1.05 SEQUENCING AND SCHEDULING

A. Complete applicable Work specified in Section 31 10 00, Site Clearing; Section 31 23 16, Excavation; and Section 31 23 13, Subgrade Preparation, prior to placing fill or backfill.

PART 2 PRODUCTS

2.01 SOURCE QUALITY CONTROL

A. Gradation Tests:

1. In accordance with ASTM C136 and C117.
2. As necessary to locate acceptable sources of imported material and verify excavated material.

3. During excavation or production of imported material, test as follows:
   a. Clay Cover: every 1,500 tons.
   b. General Site Fill: every 7,500 tons.
   c. Topsoil: every 7,500 tons.

B. Atterberg Limits Tests:

1. In accordance with ASTM D4318.
2. As necessary to locate acceptable sources of imported material and verify excavated material.
3. During excavation or production of imported material, test as follows:
   a. Clay Cover: every 1,500 tons.
   b. General Site Fill: every 7,500 tons.
   c. Topsoil: every 7,500 tons.
4. Minimum Plasticity Index (PI) of 15.

C. Proctor Tests:

1. In accordance with ASTM D698.
2. As necessary to locate acceptable sources of imported material and verify excavated material.
3. During excavation or production of imported material, test as follows:
   a. Clay Cover: every 1,500 tons.
   b. General Site Fill: every 7,500 tons.

D. Samples:

1. Collected in accordance with ASTM D75.
2. During excavation or production of imported material, provide Samples as follows:
   a. Clay Cover: Every 1,500 tons.
   b. General Site Fill: Every 7,500 tons.
   c. Topsoil: Every 7,500 tons.
3. Clearly mark to show source of material and intended use.

E. Source quality control samples will be collected for the analyses listed in this section. If backfill materials are from different borrows or areas, separate samples will be collected and tested for each at the specified frequencies.

F. Contractor will coordinate with Owner’s Representative when identifying new borrow source(s) for imported materials to be used for backfill to ensure that compliance samples collected from the borrow source at a frequency of one sample per 1,000 cubic yards are representative of materials transported to the site. Compliance samples will be collected by the Owner’s Representative with Contractor assistance.

G. The Owner's Representative will submit the compliance samples to the laboratory for testing for the following analyses:

1. Chemical analyses: target compound list (TCL) organics (volatile organic compounds [VOCs] and semi-volatile organic compounds [SVOCs]), TCL pesticides, TCL polychlorinated biphenyls (PCBs), herbicides, and target analyze list (TAL) metals.

H. Fertility and salinity will also be analyzed for topsoil samples.

I. The materials must meet the Illinois Clean Fill operations criteria (35 IAC 1100) for the lowest of any of the exposure routes, regardless of where the fill is being placed onsite.

2.02 CONSOLIDATION MATERIAL

A. Material intended for the consolidation area:

1. Slag and affected soil.
2. Excavated material from off-site residential properties consisting of soil potentially mixed with slag.
3. Excavated material encountered on-site including, but not limited to, concrete, building demolition debris, impacted sediments and soils, and smelter materials.

B. The Contractor is responsible for placement of all consolidation material into the consolidation area, including offsite material from surrounding properties.

2.03 CLAY COVER MATERIAL

A. On-site material naturally occurring below slag and excavated from the footprint of the consolidation area.

B. Conforming to the following properties:

1. Soil material consisting of generally clay soils with an USCS classification (ASTM D2487) of CL, CH or otherwise approved by the Owner or Owner's Representative.
2. Maximum particle size of 1-1/2 inches. Minimum of 20 percent passing the No. 200 sieve, by weight.

C. The Contractor shall be responsible for:

1. Determining if excavated material meets the specifications for clay cover material.
2. Based on these results, deciding which stockpile excavated material shall be placed in.

2.04 GENERAL SITE FILL

A. Soil material consisting of generally clay soils with an USCS classification of SC, CL, CL-ML, CH or as otherwise approved by the Owner or Owner's Representative.

B. Free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.

C. The Contractor shall be responsible for:

1. Determining if excavated material meets the specifications for general site fill material.
2. Based on these results, deciding which stockpile excavated material shall be placed in.

2.05 TOPSOIL

A. As specified in Section 32 91 13, Soil Preparation.

2.06 GRAVEL

A. Free from clods, organic matter, or other deleterious material.

B. Provide materials in accordance with current IDOT Standard Specifications for Road and Bridge Construction, gradation CA-6.

C. Physical Qualities: Per Section 1004 of the IDOT Standard Specifications for Road and Bridge Construction.

D. Gradation: Per 1004 of the IDOT Standard Specifications for Road and Bridge Construction.

2.07 WATER FOR MOISTURE CONDITIONING

A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

PART 3 EXECUTION

3.01 GENERAL

A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.

B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.

1. A Test Section of the Consolidation Material will be performed to determine the appropriate compaction characteristics in preparation for mass filling as described below.
2. Benching into adjacent lifts is permitted for the placement of the consolidation material and required for the clay cover.

C. Do not place fill or backfill, if fill or backfill material is frozen, or if surface upon which fill or backfill is to be placed is frozen.

D. Do not place fill or backfill if material is wet, or surface upon which it is to be placed is wet. With Owner Representative's approval, sediment excavated from ditches to be placed within the consolidation area may be mixed with dry fill or backfill material to obtain an acceptable moisture content, as determined by the Owner's Representative, for placement into the consolidation area.

E. Tolerances:

1. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.
2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.

3.02 FILL

A. Consolidation Material:

1. Test Section:
   a. Test section shall consist of a single 200-foot by 200-foot section.
   b. Material placed in test section shall conform to the gradations specified in ASTM D698.
   c. Maximum 8-inch thick loose lifts.
      1) Consolidation material shall be broken into pieces such that it will fit within an 8-inch loose lift.
   d. Place and compact across full width of test section
   e. Compact to a minimum of 98 percent relative compaction as determined in accordance with ASTM D698, tested via ASTM D6938.

f. Completed test section shall be proof rolled and observed for rutting and/or pumping. The magnitude of the observed rutting/pumping will be used as a performance standard for the remainder of the fill.

2. Remainder of Fill:
   a. Place and compact across full width of consolidation area.
      1) Consolidation area will be filled in a grid system, with grid size not exceeding 200 feet by 200 feet.
      2) Benching, if needed, will be allowed for the consolidation material. Adjacent lifts may key into each other up to 2-feet, and at a thickness of 1/2 the lift thickness.
   b. Compaction shall be performed via proof rolling:
      1) The same type of equipment used for the proof rolling of the Test Section shall be used for the remainder of the consolidation area fill.
      2) Compact to the performance standard set forth during the test section proof rolling.

B. Clay Cover:

1. Maximum 6-inch thick lifts.
2. Place and compact across full width of cover.
3. Compact to minimum 98 percent relative compaction as determined in accordance with ASTM D698.
4. Compact at moisture content equal to or greater than the optimum moisture content determined in accordance with ASTM D698.
5. Compact using a sheepsfoot or padfoot roller compactor that substantially penetrates the depth of each lift.

C. General Site Fill:

1. Allow for 12-inch thickness of topsoil where required.
2. Maximum 12-inch thick lifts.
3. Compact to minimum 98 percent relative compaction as determined in accordance with ASTM D698.
4. Dress completed fill with allowance for topsoil, crest surfacing, and slope protection, where applicable.

3.03 SITE TESTING

A. Gradation, Atterberg Limits, and Proctor Tests:

1. One sample from each 1,500 tons of finished product or more often as determined by Engineer, if variation in gradation is occurring, or if material appears to depart from Specifications.

2. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.
3. Remove material placed in Work that does not meet Specification requirements.

B. In-Place Density Tests: In accordance with ASTM D6938. During placement of materials, test as follows:

1. Consolidation Material: In-Place Density Tests will only be performed on the test section, approximately five tests per 200-foot grid.
2. Clay Cover: One test per 100-foot grid, each lift.

C. Proof Rolling:

1. Performed only on consolidation material after lifts have been completed and compacted.
2. Performance criteria for proof rolling will be established during the placement of the test section.
3. The same type of equipment used for the proof rolling of the test section shall be used for the remainder of the consolidation area fill.

3.04 REPLACING OVER-EXCAVATED MATERIAL/FILLING VOIDS

A. Replace excavation carried below grade lines shown or established by Engineer, or voids encountered during excavation as follows:

1. Beneath Fill or Backfill:
   a. Same material as specified for overlying fill or backfill.
   b. Compact as specified in paragraph 3.02.

3.05 RESTORATION

A. The Contractor will restore wetlands and other waters of the United States, if required based on input from EPA and other regulatory agencies based on the results of the wetlands and other waters delineation that Contractor performs per Section 02 24 00, Delineation of Wetlands and Other Waters of the United States.

END OF SECTION

SECTION 32 91 13
SOIL PREPARATION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
   a. C33/C33M, Standard Specification for Concrete Aggregates.
   b. C602, Standard Specification for Agricultural Liming Materials.
   c. D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
   d. D5268, Standard Specification for Topsoil Used for Landscaping Purposes.

1.02 SUBMITTALS

A. Action Submittals:

1. Samples: Representative of stockpiled or imported topsoil.

B. Informational Submittals:

1. Certified Topsoil Analysis Reports:
   a. Indicate quantities of materials necessary to bring imported topsoil into compliance with textural/gradation requirements.
   b. Indicate quantity of lime, quantity and analysis of fertilizer, and quantity and type of soil additive.

1.03 SEQUENCING AND SCHEDULING

A. Perform Work specified in Section 31 10 00, Site Clearing, Section 31 23 16, Excavation, and Section 31 23 23, Fill and Backfill prior to performing Work specified under this section.

PART 2 PRODUCTS

2.01 TOPSOIL

A. General: Natural, friable, sandy loam, obtained from well-drained areas, free from objects larger than 1-1/2 inches maximum dimension, and free of subsoil, roots, grass, other foreign matter, hazardous or toxic substances, and deleterious material that may be harmful to plant growth or may hinder grading, planting, or maintenance.

B. Composition: In general accordance with ASTM D5268:

1. Gravel-Sized Fraction: Maximum 5 percent by weight retained on a No. 10 sieve.
2. Sand-Sized Fraction: 20 to 60 percent passing No. 10 sieve.
3. Silt and Clay-Sized Fraction: 35 to 70 percent.

C. Organic Matter: Minimum 1.5 percent by dry weight as determined in accordance with ASTM D2974.

D. pH: Range 6.5 to 7.5.

E. Textural Amendments: Amend as necessary to conform to required composition by incorporating sand, peat, manure, or sawdust.

F. Source: Import topsoil if onsite material is insufficient in quantity.

2.02 LIME

A. Composition: Ground limestone with not less than 85 percent total carbonates, ASTM C602.

B. Gradation:

1. Minimum 50 percent passing No. 100 sieve.
2. Minimum 90 percent passing No. 20 sieve.
3. Coarser material acceptable provided rates of application are increased proportionately on basis of quantities passing No. 100 sieve.

2.03 SOIL ADDITIVES

A. Sawdust or Ground Bark:

1. Nontoxic, of uniform texture, and subject to slow decomposition when mixed with soil.
2. Nitrogen-treated, or if untreated mix with minimum 0.15 pound of ammonium nitrate or 0.25 pound of ammonium sulfate per cubic foot of loose material.

B. Peat:

1. Composition: Natural residue formed by decomposition of reeds, sedges, or mosses in a freshwater environment, free from lumps, roots, and stones.
   a. Organic Matter: Not less than 90 percent on a dry weight basis as determined by ASTM D2974.
   b. Moisture Content: Maximum 65 percent by weight at time of delivery.

C. Fertilizer:

1. Natural:
   a. Manure:
      1) Well-rotted, stable or cattle manure, free from weed seed and refuse.
      2) Maximum 50 percent sawdust or shavings by volume.
      3) Age: Minimum 4 months; maximum 2 years.
2. Commercial:
   a. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose.
   b. Contain the following minimum percentage of plant food by weight:
      1) Summer Mix:
         a) Nitrogen: 20 percent.
         b) Phosphoric Acid: 10 percent.
         c) Potash: 10 percent.
      2) Winter Mix:
         a) Nitrogen: 16 percent.
         b) Phosphoric Acid: 8 percent.
         c) Potash: 0 percent.

D. Sand: Fine Aggregate: Clean, coarse, well-graded, ASTM C33/C33M.

2.04 SOURCE QUALITY CONTROL

A. Topsoil Analysis/Testing: Performed by county or state soil testing service or approved certified independent testing laboratory.

B. Source quality control samples will be collected at the frequency and for the analyses listed in Section 31 23 23, Fill and Backfill. If topsoil is from different borrows or areas, separate samples will be collected and tested for each at the specified frequencies.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

A. Scarify subgrade to minimum depth of 6 inches where topsoil is to be placed.

B. Remove stones over 2-1/2 inches in any dimension, sticks, roots, rubbish, and other extraneous material.

C. Limit preparation to areas which will receive topsoil within 2 days after preparation.

3.02 TOPSOIL PLACEMENT

A. Do not place topsoil when subsoil or topsoil is frozen, excessively wet, or otherwise detrimental to the Work.

B. Mix soil amendments, lime, and other soil additives, identified in analysis reports with topsoil before placement or spread on topsoil surface and mix thoroughly into entire depth of topsoil before planting or seeding. Delay mixing of fertilizer if planting or seeding will not occur within 3 days.

C. Place topsoil to depth as shown where seeding and planting are scheduled.

D. Uniformly distribute to within 1/2 inch of final grades. Fine grade topsoil eliminating rough or low areas and maintaining levels, profiles, and contours of subgrade.

E. Remove stones exceeding 1-1/2-inch diameter, roots, sticks, debris, and foreign matter during and after topsoil placement.

F. Remove surplus subsoil and topsoil from Site. Grade stockpile area as necessary and place in condition acceptable for planting or seeding.

END OF SECTION

SECTION 32 92 00
TURF AND GRASSES

PART 1 GENERAL

1.01 DEFINITIONS

A. Maintenance Period: Begin maintenance immediately after each area is planted (seed, sod, or sprig) and continue for a period of 8 weeks after all planting under this section is completed.

B. Satisfactory Stand: Grass or section of grass of 10,000 square feet or larger that has:

1. No bare spots larger than 3 square feet.
2. Not more than 10 percent of total area with bare spots larger than 1 square foot.
3. Not more than 15 percent of total area with bare spots larger than 6 square inches.

1.02 SUBMITTALS

A. Action Submittals: Product labels/data sheets.

B. Informational Submittals:

1. Seed: Certification of seed analysis, germination rate, and inoculation:
   a. Certify that each lot of seed has been tested by a testing laboratory certified in seed testing, within 6 months of date of delivery. Include with certification:
      1) Name and address of laboratory.
      2) Date of test.
      3) Lot number for each seed specified.
      4) Test Results: (i) name, (ii) percentages of purity and of germination, and (iii) weed content for each kind of seed furnished.
   b. Mixtures: Proportions of each kind of seed.
2. Seed Inoculant Certification: Bacteria prepared specifically for legume species to be inoculated.
3. Description of required maintenance activities and activity frequency.

1.03 DELIVERY, STORAGE, AND PROTECTION

A. Seed:

1. Furnish in standard containers with seed name, lot number, net weight, percentages of purity, germination, and hard seed and maximum weed seed content, clearly marked for each container of seed.
2. Keep dry during storage.

B. Hydroseeding Mulch: Mark package of wood fiber mulch to show air dry weight.

1.04 WEATHER RESTRICTIONS

A. Perform Work under favorable weather and soil moisture conditions as determined by accepted local practice.

1.05 SEQUENCING AND SCHEDULING

A. Prepare topsoil as specified in Section 32 91 13, Soil Preparation, before starting Work of this section.

B. Complete Work under this section within 3 days following completion of soil preparation.

C. Notify Engineer at least 3 days in advance of:

1. Each material delivery.
2. Start of planting activity.

D. Planting Season: Those times of year that are normal for such Work as determined by accepted local practice.

1.06 MAINTENANCE SERVICE

A. Contractor: Perform maintenance operations during maintenance period to include:

1. Watering: Keep surface moist.
2. Washouts: Repair by filling with topsoil, liming, fertilizing, seeding, and mulching.
3. Mulch: Replace wherever and whenever washed or blown away.
4. Mowing: Mow to 2 inches after grass height reaches 3 inches, and mow to maintain grass height from exceeding 3-1/2 inches.

5. Reseed unsatisfactory areas or portions thereof immediately at the end of the maintenance period if a satisfactory stand has not been produced.
6. Reseed/replant during next planting season if scheduled end of maintenance period falls after September 15.
7. Reseed/replant entire area if satisfactory stand does not develop by July 1 of the following year.

PART 2 PRODUCTS

2.01 FERTILIZER

A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose. Minimum percentage of plant food by weight.

B. Application Rates: Determined by soil analysis results.

C. Mix:

1. Nitrogen: 10 percent.
2. Phosphoric Acid: 10 percent.
3. Potash: 10 percent.
4. Bonemeal: Commercial, raw, finely ground, with minimum analysis of 4 percent nitrogen and 20 percent phosphoric acid.
5. Superphosphate: Soluble mixture of phosphate obtained from treated mineral phosphates with minimum analysis of 20 percent available phosphoric acid.

D. Top Dress Type: As recommended by local authority.

2.02 SEED

A. Fresh, clean new-crop seed that complies with the tolerance for purity and germination established by Official Seed Analysts of North America.

B. Seeds of Legumes: Inoculated with pure culture of nitrogen-fixing bacteria prepared specifically for legume species in accordance with inoculant manufacturer’s instructions.

C. Seed Mix:

1. General: shall conform to IDOT Class 4 Native Grass Mixture.
2. Ditches: shall conform to IDOT Class 4B Wetland Grass and Sedge Mix.
3. Winter Protective Seed: Annual ryegrass.

2.03 STRAW MULCH

A. Threshed straw of oats, wheat, barley, or rye, free from (i) seed of noxious weeds or (ii) clean salt hay.

2.04 HYDROSEEDING MULCH

A. Wood Cellulose Fiber Mulch:

1. Specially processed wood fiber containing no growth or germination inhibiting factors.
2. Dyed a suitable color to facilitate inspection of material placement.
3. Manufactured such that after addition and agitation in slurry tanks with water, the material fibers will become uniformly suspended to form homogenous slurry.
4. When hydraulically sprayed on ground, material will allow absorption and percolation of moisture.

2.05 NETTING

A. Jute:

1. Heavy-duty, twisted, weighing 1 pound per square yard.
2. Openings Between Strands: Approximately 1 inch square.

B. Matting:

1. Excelsior mat or straw blanket; staples as recommended by matting manufacturer.
2. Manufacturers and Products:
   a. Akzo Industries, Ashville, NC; Curlex mat.
   b. North American Green, Evansville, IN; S150 blanket.

2.06 TACKIFIER

A. Derived from natural organic plant sources containing no growth or germination-inhibiting materials.

1. Capable of hydrating in water, and to readily blend with other slurry materials.
2. Wood Cellulose Fiber: Add as tracer, at rate of 150 pounds per acre.
3. Manufacturers and Products:
   a. Chevron Asphalt Co.; CSS 1.
   b. Terra; Tack AR.
   c. J Tack; Reclamare.

2.07 WEED BARRIER

A. 6 mils (0.006 inch) black polyethylene sheet.

PART 3 EXECUTION

3.01 PREPARATION

A. Grade areas to smooth, even surface with loose, uniformly fine texture.

1. Roll and rake, remove ridges, fill depressions to meet finish grades.
2. Limit such Work to areas to be planted within immediate future.
3. Remove debris, and stones larger than 1-1/2-inch diameter, and other objects that may interfere with planting and maintenance operations.

B. Moisten prepared areas before planting if soil is dry. Water thoroughly and allow surface to dry off before seeding. Do not create muddy soil.

C. Restore prepared areas to specified condition if eroded or otherwise disturbed after preparation and before planting.

3.02 FERTILIZER

A. Apply evenly over area in accordance with manufacturer's instructions. Mix into top 2 inches of topsoil, when applied by broad cast method.

B. Application Rate: 23 pounds per 1,000 square feet (1,000 pounds per acre).

3.03 SEEDING

A. Start within 2 days of preparation completion.

B. Hydroseed slopes steeper than 3H:1V. Flatter slopes may be mechanically seeded.

C. Mechanical: Broadcast seed in two different directions, compact seeded area with cultipacter or roller.

1. Sow seed at uniform rate of 50 pounds per acre.
2. Use Brillion type seeder.
3. Broadcasting will be allowed only in areas too small to use Brillion type seeder. Where seed is broadcast, increase seeding rate 20 percent.
4. Roll with ring roller to cover seed, and water with fine spray.

D. Hydroseeding:

1. Application Rate: 50 pounds per acre.
2. Apply on moist soil, only after free surface water has drained away.
3. Prevent drift and displacement of mixture into other areas.
4. Upon application, allow absorption and percolation of moisture into ground.
5. Mixtures: Seed and fertilizer may be mixed together, apply within 30 minutes of mixing to prevent fertilizer from burning seed.

E. Cover Crop Seeding: Apply seed at rate of 120 pounds per acre to areas that are bare or incomplete after September 15.

F. Mulching: Apply uniform cover of straw mulch at a rate of 2 tons per acre.

G. Netting: Immediately after mulching, place over mulched areas with slopes steeper than 3H:1V, in accordance with manufacturer's instructions. Locate strips parallel to slope and completely cover seeded areas.

H. Tackifier: Apply over mulched areas with slopes steeper than 4:1 at rate of 5 gallons per 1,000 square feet in accordance with the manufacturers recommended requirements.

I. Water: Apply with fine spray after mulching to saturate top 4 inches of soil.

3.04 FIELD QUALITY CONTROL

A. 8 weeks after seeding is complete and on written notice from Contractor, Engineer will, within 15 days of receipt, determine if a satisfactory stand has been established.

B. If a satisfactory stand has not been established, Contractor shall re-seed at their own expense. Once a satisfactory stand is established, the Contractor shall notify the Engineer.

3.05 PROTECTION

A. Protect from pedestrian traffic by erecting temporary fence around each newly seeded area.

END OF SECTION

Appendix D
Construction Quality Assurance Plan

CONSTRUCTION QUALITY ASSURANCE/
QUALITY CONTROL PLAN

Old American Zinc Superfund Site
Fairmont City
St. Clair County, Illinois

Preliminary Remedial Design
WA No. 224-RDRD-B5A1 / Contract No. EP-S5-06-01

Prepared for

October 2018

ch2m

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Acronyms and Abbreviations

ASTM	ASTM International
CH2M	CH2M HILL, Inc.
EPA	U.S. Environmental Protection Agency
HASP	health and safety plan
KA	contract administrator
OAZ	Old American Zinc
QA	quality assurance
QAP	Construction Quality Assurance/Quality Control Plan
QC	quality control
RFI	Request for Information

SECTION 1

Introduction

1.1 Purpose and Objective

This Construction Quality Assurance/Quality Control Plan (QAP) establishes project control procedures and presents procedures used so that the highest-quality product and services are delivered to the owner. It establishes guidelines for reviewing procedures and deliverables, identifying and resolving potential issues before impacting project objectives, and determining the most efficient ways to correct these issues. This QAP focuses on the construction of an onsite consolidation cell at the Old American Zinc (OAZ) Superfund Site in Fairmont City, Illinois, and is prepared in accordance with U.S. Environmental Protection Agency (EPA) Work Assignment No. 224-RDRD-B5A1 under Contract No. EP-S5-06-01. These procedures and processes are derived from the CH2M HILL, Inc. (CH2M) *Construction Quality Management Manual* and CH2M's core quality standards.

This QAP establishes and implements the following quality assurance (QA)/quality control (QC) elements for the project:

- QC organization and responsibilities
- Training and qualification of project personnel, including subcontractors
- Inspections
- Monitoring tests and observations
- Calibration and maintenance
- Data quality
- Submittal review and approval
- QC documentation
- Change control
- Noncompliance and corrective actions
- Document and technical reviews
- Project communications

The strategy of the QAP is to use a proactive approach to identifying engineering quality in the critical work elements of the project before implementation and during construction. The contractor will use internal experts so critical work elements of the project are identified and proper QC procedures are established. The contractor also will consult with the project stakeholders such as EPA and the oversight contractor to verify that all requirements and expectations for the project are met. The contractor will use communication vehicles such as weekly or monthly meetings, telephone or video conferences, and e-mail to discuss and resolve issues related to the successful implementation of the project.

The overall project objective is to construct an onsite consolidation cell in a cost-effective and environmentally safe manner. The use of "CH2M" in this document means CH2M and its subcontractors.

1.2 Definable Features of Work

A definable feature of work is a task that is separate and distinct from other tasks and has separate control requirements. The QAP outlines the QC requirements applicable to perform the definable feature of work activities for this project, which include:

- Project management, site management, and health and safety
- Mobilization, site preparation, site controls, and demobilization

- Site clearing and grubbing
- Subgrade preparation
- Low-permeability soil placement
- Vegetative cover soil placement
- Seeding and site restoration
- Universal waste abatement
- Material management
- Transportation and disposal
- Demobilization and construction completion reporting

These activities will be performed in accordance with the respective subcontractor's statement of work, project planning documents, and the project management work plan. All submittals will have been reviewed/approved by CH2M before mobilization and will be onsite at all times for reference.

SECTION 2

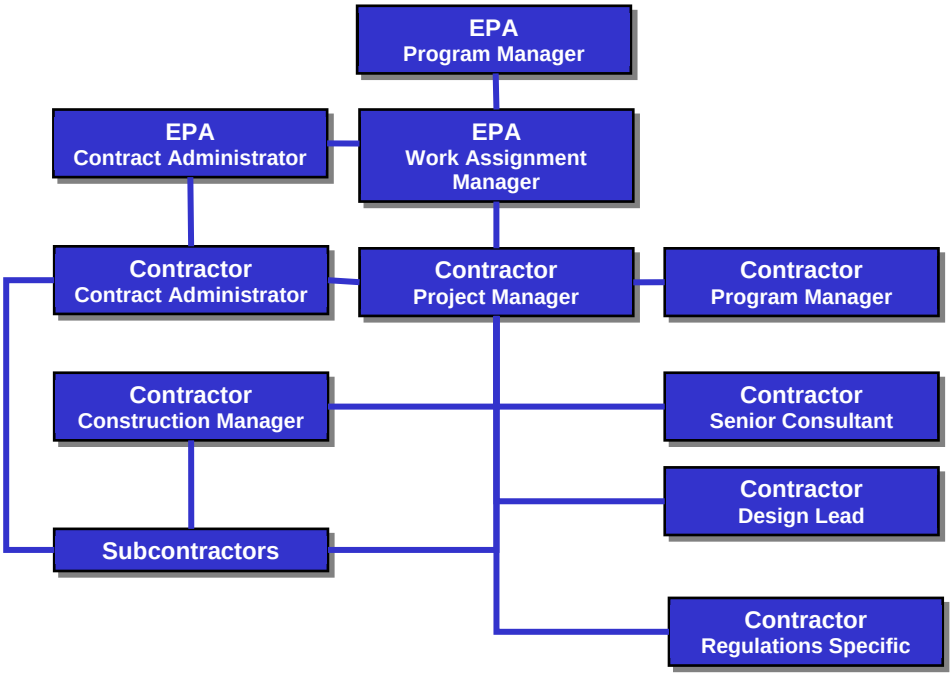
Organization and Responsibilities

The responsibility for implementing and enforcing the QAP is assigned to the project manager. The project quality manager will assume execution responsibility of this QAP. The program QA/QC manager is responsible for QA and verification of the effectiveness of the program and project QC.

2.1 Responsibility and Authority

The following subsections outline the responsibilities of the key members in the project organization. Figure 2-1 shows the project organization chart and identifies lines of communications between project parties.

Figure 2-1. Organization Chart
Old American Zinc Superfund Site Fairmont City, St. Clair County, Illinois



2.1.1 Owner

EPA is the project owner. The owner is responsible for the overall design, construction, and closure of the site. The owner has the authority to complete the following actions:

- Select and dismiss organizations charged with design, QA, and construction activities
- Accept, reject, or modify design plans and specifications
- Accept, reject, or modify the QAP and reports
- Accept or reject the materials and workmanship of the construction subcontractors

2.1.2 Project Manager

The project manager is responsible for the overall execution of the project. The project manager will interact and communicate directly with EPA and the project team regularly throughout the remedial design/remedial action so that the contract and performance objectives are met. The project manager

ultimately is accountable for the work activities undertaken on the project. As such, the project manager will provide the managerial administrative skills so that resource allocations, planning, execution, and reporting meet expectations and contract requirements. Specifically, the project manager is responsible for the following:

- Organize project staff and assign responsibilities
- Understand the contract and scope of work
- Communicate to the project staff and subcontractors regarding owner requirements and QA/QC practices
- Identify and provide documentation and notify the owner and project team of changes in the scope of work, project documentation, and activities
- Ensure submittals are received by subcontractors and reviewed by appropriate personnel
- Supervise preparation and approval of project-specific procedures, work plans, and QA project plans
- Approve project design bases, design parameters, drawings, and reports
- Approve project construction methodologies
- Disseminate project-related information from the owner such as design bases, input parameters, and drawings
- Serve as liaison for communications with the owner and subcontractors
- Serve as liaison between the project staff and other internal and external groups
- Determine whether drawings require independent review
- Investigate nonconformance and implementation of corrective actions
- Evaluate the effect of nonconformance on the project for reporting such items to the owner and provide appropriate documentation for reporting
- Determine that changes, revisions, and rework items are subject to the same QC requirements as the original work
- Serve as final reviewer prior to release of project information
- Approve and sign outgoing correspondence
- Coordinate and attend the project kickoff meeting, preconstruction meeting, and regular project status meetings
- Attend partnering meetings and public/regulatory meetings

This list is not meant to be all-inclusive, and the project manager may assign some of these responsibilities to the construction manager, who will remain onsite throughout the project field activities.

2.1.3 Construction Manager

The construction manager is responsible to the project manager for efficiently applying the resources of the project team to execute construction. In addition, the construction manager is responsible for the technical, personnel, construction methodology, quality, safety, and local client interface details of the project and the project team while mobilized to the site. The construction manager will assist the project manager so that sufficient resource allocations to maintain project schedule and budget are

maintained and provide daily feedback to the project manager on project progress, issues requiring resolution, and other project specific issues, as required.

The quality-related responsibilities of the construction manager and site superintendent include, but are not limited to, the following:

- Notify the project manager if the project cannot be completed with regard to quality, schedule, or cost
- Provide oversight and control of subcontractor services
- Organize and set up temporary facilities and storage yards for the project
- Ensure the site is constructed in accordance with the construction drawings and technical specifications
- Monitor the construction productivity in relation to construction schedules and technical specifications
- Serve as liaison for communications with project staff and subcontractors, as well as with the onsite client representatives
- Advise the project manager and owner of changed conditions, nonconformance, and requirements for field changes
- Coordinate daily health and safety tailgate meetings
- Attend kickoff, preconstruction, and progress status meetings
- Support and enforce health and safety requirements throughout the project
- Maintain field logs and daily reporting, including relevant photographs and pertinent events
- Review and recommend action on value engineering change proposals
- Review and recommend changes
- Prepare and submit requests for information (RFIs) and route them to the project manager and technical consultant for review and approval
- Advise on need and cost of proposed change orders
- Assist in preventing and resolving subcontractor claims
- Recommend approval or rejection of construction schedules
- Ensure subcontractors are set up for success in schedule and compliance
- Continuously monitor work progress, quality, safety, and adherence to authorized work scopes, budgets, and schedules
- Interface daily with the subcontractors

2.1.4 Project Quality Control Manager

The project QC manager is responsible for executing this project QAP and communicating the onsite QC program policies, objectives, and procedures to the project personnel and subcontractors during project meetings and informal discussions. Onsite technical personnel, who may include QC inspectors, engineers, chemists, hydrogeologists, and scientists, will assist the QC manager in monitoring, controlling, and documenting the quality of the onsite construction and survey activities.

The project QC manager will review and prepare documentation-related project QC, including analytical test results, inspections, material test results, and audits. The project QC manager responsibilities include, but are not limited to, the following:

- Construction QC inspections and testing of materials and workmanship
- Control testing
- Document control
- Reviewing submittals
- Administering RFIs
- Completion inspection
- Records
- Audits and surveillance

The project QC manager also will coordinate with and assist the client representative in the performance of QA/QC audits and inspections.

The project QC manager or a representation will have the authority to stop project work because of nonconformance with the QAP. Onsite personnel will be encouraged to discuss concerns with the project QC manager and supporting technical personnel. If the project QC manager is informed of and/or detects an incident of project nonconformance, the project QC manager will perform an initial investigation, evaluate the course of corrective action required, document the incident, and report the incident to the project manager. If the project QC manager is not satisfied with the resolution of the nonconformance, the project QC manager will contact the program QA/QC manager.

2.1.5 Design Manager

The design manager's primary responsibility is to design the landfill to fulfill the requirements of the Record of Decision. Design-related activities may not end until construction is complete. The design manager is responsible for the following activities during project execution:

- Review and approve construction plans (design drawings) and specifications
- Clarify or interpret requirements of the plans and specifications
- Review requests for design changes during construction, RFIs, and provide response(s) when necessary
- Prepare design changes to account for unexpected site conditions or changes in construction and operation methodology
- Review and approve shop drawings and submittals from subcontractors and vendors
- Interact with construction team on problem solving and solutions
- Observe construction of critical design features
- Provide overall input regarding the impact of scope changes on other portions of the work
- Modify or change the final plans for as-built record drawings

2.1.6 Waste Management Coordinator/Regulatory Management

The waste management coordinator/regulatory manager will provide regulatory compliance and waste management coordination and expertise. The roles and responsibility associated with this position will include preparing and collecting required waste management and tracking documentation, including waste manifests, bills of lading, weight tickets, and hazardous waste labels.

2.1.7 Health and Safety Manager

The health and safety manager for the project is responsible for the health and safety plan (HASP) to be supported by all site employees. Health and safety are team functions; compliance is required, and excellence is expected.

2.1.8 Quality Assurance/Quality Control Manager

The quality manager and onsite QA/QC manager are responsible for implementing the QAP. Quality is a team function; compliance is required on all phases of the project, and excellence is expected. The onsite QA/QC manager will assume the responsibility to coordinate and track waste shipments with the subcontractors and the disposal and recycling facilities.

2.1.9 Document Manager

The document manager will provide part-time assistance to the project and provide logistics support. This effort includes implementing document controls, disseminating communications, in-house document production (editing, graphics, word processing, and reproduction) and coordinating services related to printing, binding, and distributing the final reports in hard copy and on CD and archiving the project deliverables for easy retrieval and electronic filing.

2.1.10 Senior Consultants

Senior consultants are responsible for overseeing the planning and review of the technical and operational work performed. They will work closely with the project manager and design project manager to ensure technical excellence and compliance.

2.1.11 Project Contract Administrator

The project contract administrator (KA) will assist the team with contractual issues. The KA is responsible for ensuring procurement is conducted in accordance with the protocol for subcontracting. The KA will assist in evaluating subcontractors/vendors payment applications for processing and will be involved with any potential change order management of subcontractor(s)/vendors. In addition, the KA will ensure the potential subcontractor's/vendor's proposals contain appropriate rates and have adequate documentation. Subcontracting for this project is on a fast-track schedule.

2.1.12 Project Accountant

The project accountant will assist in matters concerning budgets, invoices, percent completes, estimates at complete, and individual project financial report formats. The project accountant is also responsible for ensuring all travel expenses are in accordance with the project budget.

2.1.13 Subcontractors

It is expected the contractor will subcontract the following services during this project:

- Surveying
- Clearing, excavation, backfilling, planting of vegetation, and site restoration
- Laboratory analyses (geotechnical)
- Special inspection, observation, and testing (geotechnical)

The contractor assumes the overall responsibility for conformance to the quality requirements for the subcontracted items and services. Each subcontractor will be responsible for planning, managing, and effectively executing the project activities in accordance with the appropriate documentation.

Subcontractors are responsible directly to the construction manager for completing the portion of project activities assigned and to the project QC manager for QAP activities. Subcontractors will verify that construction and materials used to perform the activities herein comply with the requirements of the contract plans and specifications. Subcontractors include those organizations supplying quality-related items or services to the project.

2.2 Resolution of Conflicts

If the QC team detects a nonconforming item, the QC manager will investigate it. If the QC manager determines that additional corrective action is warranted, the QC manager will document and review the issue with the site construction manager and project manager. The QC manager has the authority to stop work on any nonconforming activity. If satisfactory resolution cannot be achieved between the QC manager and the project manager, it will be elevated to the program QA/QC manager, and if necessary, to the owner.

SECTION 3

Training and Qualifications

During project team chartering, the project manager will determine the necessary staff qualifications and review the staff training documentation (resumes, professional engineer registration, health and safety, and any other certifications) needed to complete this project. The project manager will be responsible for ensuring each individual is qualified and has completed any necessary training for his or her assigned tasks. The project manager also will be responsible for determining and documenting when formal qualification or certification is required. The project manager will ensure training is completed before task initiation and that the appropriate certification documents are obtained and retained as quality records in the project files.

SECTION 4

Communications and Meetings

Table 4-1 lists the meetings that will be held throughout the project to provide regular communication between the contractor and the owner, among project team members, and between the contractor and the subcontractors.

Table 4-1. Project Meetings
Old American Zinc Superfund Site Fairmont City, St. Clair County, Illinois

		Contractor				
Meeting	**EPA**	**Project Manager**	**Construction Manager**	**Subcontractors**	**Project Staff**	**Schedule**
Kickoff meeting	X	X	X	Optional		Before mobilization
Public Meeting	X	X				Before mobilization
Preconstruction Meeting	Optional	X	X	X	X	Before mobilization
Public/Regulatory Meeting	X	X	X			If needed
Tailgate Meetings	Optional	Optional	X	X	X	Before start of work each day onsite
Project Status Meeting	Optional	X	X	X	X	Weekly (can be by teleconference)

X = Required attendance. Optional attendance is at the discretion of the project manager or EPA representative, depending on the relevance of the meeting.

4.1 Kickoff Meeting

Before the site work begins, the project team will meet with the owner and stakeholders to develop a mutual understanding of the project details, including health and safety issues, communication procedures, evacuation/emergency procedures, scheduling work, security procedures, submittal reviewer/approvers, inspectors/approvers of major milestones work performed, permits required, forms to be used, administration of onsite and offsite work, signature authorities for changes and waste documentation, schedule, and method for transmitting submittals. Minutes of the meeting will be prepared by the project manager and signed by the contractor's representative, owner's designated representatives, and stakeholders (facility personnel, fire marshal, regulatory agencies, etc.). Meeting minutes will be distributed to the parties involved in the meeting and placed in the project files. This meeting may be held in conjunction with other meetings (for example, the preconstruction meeting).

4.2 Preconstruction Meeting

A preconstruction meeting with the project subcontractors is required for discussing the administrative procedures for the project. During the conference, ground rules and understandings will be established between the contractor and its subcontractors. This meeting also is an opportunity to emphasize the importance of health and safety, quality, and regulatory compliance to the subcontractors.

The preconstruction meeting will be held between the project team and subcontractors' representatives. The owner may also be present, or a separate preconstruction meeting with the owner

may be conducted after the contractor has met formally with its subcontractors. This meeting will be conducted to ensure all parties involved in the project understand and agree on the following:

- Project scope
- Work approach, construction means, and methods
- Roles and responsibilities
- Designation of responsible personnel
- Schedule
- Submittal requirements
- Reporting and documentation requirements
- Use of the site for storage, vehicle parking, access routes, and other site requirements
- Change management processes and procedures
- Communication procedures
- Client requirements
- Health and safety requirements
- Progress schedules
- Permitting and regulatory issues
- Quality issues and reporting
- Security and housekeeping procedures
- Procedures for maintaining record documents
- Waste handling and documentation
- Testing and inspection schedule and reporting

Minutes of the meeting will be prepared by the project manager or construction manager and signed by both the contractor's and subcontractors' representatives. Copies of the minutes will be distributed to the parties from the meeting and placed in the project files.

4.3 Public/Regulatory Meetings

The contractor will participate in any public/regulatory meetings to present the proposed plan/Record of Decision for the project as needed.

4.4 Tailgate Meetings

Daily tailgate meetings will be held with all project personnel in attendance to review safety hazards posed and required health and safety procedures and job hazard analyses applicable to each day's activities. At the start of each day, the construction manager will discuss the proposed work tasks for that day, with input from the work crew, so that site workers are familiar with the proposed activities. The day's tasks, personnel, tools, and equipment that will be used to perform these tasks will be reviewed, along with the hazards posed, associated mitigations, and required health and safety procedures. These daily tailgate meetings promote worker participation in the hazard recognition and control process, while reinforcing the task-specific hazard and required health and safety procedures with the crew each day.

4.5 Project Status Meetings

After the start of site work and throughout project execution, the project team will conduct project status meetings (sometimes referred to as a quality meeting) at least weekly during active construction. The owner's representatives and stakeholders may attend these meetings. The main purpose of the meetings is to track progress to date and discuss progress planned over the next 2 or 3 weeks (look-ahead scheduling) to resolve project issues before they may occur.

At a minimum, the following will be accomplished at each meeting:

- Review the minutes of the previous meeting
- Discuss health and safety issues
- Review the schedule:
  - Work or testing accomplished since last meeting
  - Rework items identified since last meeting
  - Rework items completed since last meeting
  - Schedule delays and long lead time items
  - Critical milestones
- Review the status of submittals:
  - Submittals reviewed and approved since last meeting
  - Submittals required in the near future
  - RFI resolutions
- Review the work to be accomplished in the next 2 weeks and documentation required:
  - Establish completion dates for rework items
  - Inspections required
  - Testing required
  - Status of offsite work or testing
  - Documentation required
- Discuss health and safety issues (for example, near-misses and incidents)
- Resolve QC and production problems
- Address items that may require revising the project plans:
  - Changes in procedures
  - Changes in design/engineering drawings and/or specifications
- Address field change requests, design change notices, or RFIs

Meetings will be recorded in project status meeting minutes, prepared by the construction manager or QC manager. The meetings may be held in conjunction with other meetings (such as tailgate safety meetings, progress meetings, planning meetings, etc.). Meeting minutes will be provided to the project manager and placed in the project files in addition to being forwarded to protect team members.

SECTION 5

Inspection Activities

The project QC manager is responsible for performing inspection activities and documenting compliance with project requirements.

5.1 Inspections

The QC manager's responsibilities include inspecting the equipment and materials before being accepted and installed at the site, and daily reviewing all construction activities required to complete the scope of work as identified in the final approved project plans. Table 5-1 lists inspection activities for the project that the QC manager will perform.

Table 5-1. Project Inspection Activities by Task
Old American Zinc Superfund Site Fairmont City, St. Clair County, Illinois

Task	Inspection
Mobilization	• Ensure preconstruction and construction QC submittals are reviewed and approved. • Review qualifications of personnel to ensure they meet the specification and work plan requirements (certifications, licenses, etc.). • Ensure the following are onsite before any work begins: HASP, activity hazard analyses, personnel training certificates, subcontractor statements of work and compensation schedule, emergency route to hospital, and Dig Safe reference number. • Ensure materials and equipment are received in working order and in compliance with work plans and specifications. • Ensure materials and equipment are stored in accordance with work plans and specifications. • Ensure adequate permits. • Maintain construction schedule. • Design traffic routes for compliance with work plan. • Verify catch basins grates are covered with filter fabric. • Enable site security measures for compliance with work plan. • Review layout drawings for completeness and accuracy. • Verify connection of temporary facilities. • Review staging areas for storage of wastes, recyclable materials, heavy equipment, and storage containers. • Inspect decontamination areas to ensure they meet the requirements of the plans. • Verify equipment condition is acceptable and that features (such as backup alarms) function properly. • Verify personnel are properly trained and certified to perform the work. • Ensure personnel have proper personal protective equipment to perform the work. • Ensure work zones and signage are properly established. • Ensure proper material safety data sheets are available onsite. • Ensure break and rest areas are established. • Ensure utilities are properly protected.

Table 5-1. Project Inspection Activities by Task

Old American Zinc Superfund Site Fairmont City, St. Clair County, Illinois

Task	Inspection
Clearing and Grubbing	• Ensure topsoil and vegetative matter are removed from existing ground surface. • Perform clearing and grubbing limits/layout. • Ensure utility clearance. • Perform clearing separate from grubbing when required. • Dispose of cleared and grubbed materials. • Ensure limited or no disturbance of adjacent areas. • Visually characterize site for types of vegetative cover, debris, and obstructions.
Erosion Control	• Receive and approve submittals. • Confirm materials meet specifications and plans. • Maintain site layout and drawings on hand. • Ensure control device locations are properly laid out and marked prior to installation. • Ensure control devices are properly installed. • Ensure control devices are adequate to minimize run-on and runoff. • Note and repair damaged areas in a timely manner. • Ensure control devices are regularly maintained, cleaned, and silt removed.
Surveying	• Provide surveyor qualifications/licenses. • Establish temporary control points. • Verify existing monuments. • Protect monuments and control points. • Ensure instrument calibration and accuracy. • Survey horizontal and vertical control. • Survey tolerances (horizontal and vertical angles). • Reference applicable plane coordinates and vertical datum. • Provide surveyor notes that are legible, accurate, and complete. • Provide electronic and hard copy data deliverables. • Ensure stake alignment and spacing intervals • Ensure stake flagging/marking. • Provide as-builts, drawings, and maps.
Material Receiving	• Visually inspect material upon arrival to the site for damages. • Check type and quantities of arrived materials against purchase order, shipping label, and confirmation lists. Note any incorrect quantities, incorrect type and models, and missing items. • Visually inspect the quality of material if the material has manufacturer-specified grade or quality rating. • Inspect and verify the received materials. Ensure they were built or manufactured in accordance to manufacturer specifications or data.

Table 5-1. Project Inspection Activities by Task

Old American Zinc Superfund Site Fairmont City, St. Clair County, Illinois

Task	Inspection
	• Document and report material/product deficiencies and/or irregularities immediately to QC manager and project manager. • Inspect the temporary storage area provided by the construction subcontractor for material storage to ensure the materials are stored in a safe, secure, and manufacturer-specified environment prior to usage in construction.
Earthwork	• Provide layout drawings. • Ensure Unified Soil Classification System classification (soil/aggregate). • Perform laboratory compaction characteristics. • Perform sieve analysis. • Perform Atterberg limits (liquid limit, plastic limit, Plasticity Index). • Report general fill condition (homogenous, no large debris or root matter). • Ensure imported fill material chemically acceptable or certified as clean fill. • Provide excavation methods. • Ensure surface preparation. • Perform material placement (lift thickness). • Perform material compaction tests (in situ). • Ensure adequate compaction equipment. • Perform compaction testing. • Perform rough grading. • Perform finish grading/proof rolling. • Perform survey control. • Inspect surface water run-on, runoff control. • Provide as-builts. • Ensure previous surface approved. • Ensure surface is free of ice, snow, and excessive water.
Utility Terminations	• Ensure utilities are terminated in accordance with the project technical plan and before demolition. • Ensure the lockout/tagout of pressure and electrical utilities is performed. • Verify utilities are terminated in accordance with utility specifications.
Emissions/ Dust Control	• Ensure dust is controlled and does not exceed the action levels identified in the HASP.
Material Management and Staging	• Ensure proper segregation of recyclable materials. • Ensure demolition debris is segregated and staged in accordance with the project technical plan.

Table 5-1. Project Inspection Activities by Task

Old American Zinc Superfund Site Fairmont City, St. Clair County, Illinois

Task	Inspection
Decontamination of Equipment	• Ensure decontamination area laid out per drawings and plans. • Ensure proper decontamination equipment installed. • Provide waste collection system in place and appropriate for the job. • Provide spill prevention and recovery plan in place. • Ensure equipment is properly decontaminated. • Ensure sufficient equipment and supplies on hand. • Ensure waste containers are correctly staged, labeled, and inventoried.
Site Restoration/ Landscaping	• Provide layout drawings. • Provide restoration methods and limits. • Ensure material/product quality (supplier certifications): seed, sod, sprigs, erosion control matting, mulch, fertilizer, and vegetation. • Perform surface preparation. • Ensure topsoil suitability and placement. • Ensure material application (casting) rates. • Provide mulching and fertilizing. • Perform damage (for example, washout) repair. • Ensure defective material rejection. • Ensure unused material is properly stored.
Demobilization/ Project Closeout	• Inspect work areas to ensure temporary facilities, equipment, and materials are safely removed from the site. • Inspect work areas to ensure project housekeeping and cleaning. • Provide decontamination of equipment. • Perform completion inspection when work is substantially complete. • Provide punch lists on outstanding items. • Perform project housekeeping and final project cleaning. • Perform final inspections of the work areas. • Provide orderly site demobilization. • Ensure collation of site records and documents. • Transfer records and documentation to project manager. • Ensure purchase order closeouts. • Provide final reports and deliverables.

As additional project-specific tasks are identified, this QAP will be amended to include inspections for those tasks.

5.2 Punch List Inspection

Punch list inspections may occur near the completion of project work or any part thereof. The QC manager will conduct an inspection of the work and develop a punch list of items that do not conform to the approved drawings and specifications. The QC manager will include in the punch list any remaining items on a "rework items list" that were not corrected before the punch list inspection. The punch list will include the estimated date by which the deficiencies will be corrected. The QC manager or staff will make follow-up inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, the contractor will notify the government that the facility is ready for prefinal inspection.

5.3 Prefinal Inspection

The contractor will perform a prefinal inspection to verify that the facility or work area is complete and ready to be occupied. The contractor will schedule and invite members from the end user of the site to participate in the prefinal inspection. A prefinal inspection list may be developed as a result of this inspection. Each deficiency noted in the punch list will identify the applicable reference (specification paragraph, drawing number, etc.) from which the deficiency stems. The QC manager will ensure all items on this list are corrected before notifying the owner that a final inspection with the stakeholders can be scheduled. Items noted during the prefinal inspection will be corrected in a timely manner and accomplished within the time slated for completion of the entire work, or any particular increment thereof if the project is divided into increments by separate completion dates.

5.4 Final Acceptance Inspection

The QC manager, construction manager, other project management personnel, and owner representatives will attend the final acceptance inspection. Other owner personnel and stakeholders may also attend. The owner, based upon results of the prefinal inspection, will formally schedule the final acceptance inspection. Scheduling should be coordinated with the stakeholders at least 14 days before the final inspection. A final acceptance inspection will be considered closed when the work has been accepted by EPA and its stakeholders and the acceptance has been documented and signed by all parties.